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**21<sup>st</sup>**  
yearbook

*American Council on  
Industrial Arts Teacher Education*

**INDUSTRIAL ARTS FOR  
THE EARLY  
ADOLESCENT**



# INDUSTRIAL ARTS FOR THE EARLY ADOLESCENT

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**21st  
yearbook**

*American Council on  
Industrial Arts Teacher Education*

A Division of the American Industrial Arts Association  
and the National Education Association



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# Foreword

Junior high and middle school students comprise a significant proportion of the enrollments in industrial arts education. This yearbook examines the educational needs of these early adolescents and explores ways in which industrial arts programs may be of value to them.

The 20th Yearbook, *Components of Teacher Education*, considered the problems of industrial arts teacher education. Subsequent volumes are planned to probe the role of industrial arts in the elementary and senior high schools. Taken together, the four issues, including this present one, will provide a comprehensive overview of industrial arts education at all levels of the formal school program.

The authors of the present volume have studied patterns of educational organization and contemporary educational purposes. Within that frame of reference, they have discussed the development of an industrial arts curriculum to meet the needs of early adolescent learners. In addition, descriptions of locally-sponsored innovations have been included as examples of contemporary improvements in existing industrial arts programs for these youth.

The Yearbook Committee and the Officers of ACIATE are pleased to present this report to the profession. With this volume, the yearbook series "comes of age" as a long-standing contributor to the literature of the educational profession.

The debt of the membership of the Council to McKnight and McKnight Publishing Company deepens with each succeeding year. They continue to underwrite yearbook production costs, and, on each respective volume, they absorb this outlay to the extent that sales do not equal the investment. Further, they pay to the Council any receipts in excess of production costs. This frees the Yearbook Committee from monetary constraints when yearbook proposals are considered. As a result, they need to be concerned only with the professional value of any proposal, a luxury rarely enjoyed by educators.

Donald G. Lux  
*President*

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# Yearbook Proposals

Each year, at the AIAA national convention, the ACIATE Yearbook Committee reviews the progress of yearbooks in preparation and evaluates proposals for additional yearbooks. Any member is welcome to submit a yearbook proposal. It should be written in sufficient detail for the committee to be able to understand the proposed substance and format, and sent to the committee chairman by February 1 of the year in which the convention is held. Below are the criteria employed by the committee in making yearbook selections.

Frederick D. Kagy, Chairman  
ACIATE Yearbook Committee

## Guidelines for ACIATE Yearbook Topic Selection

With reference to a specific yearbook topic:

1. It should make a direct contribution to the understanding and the improvement of industrial arts teacher education.
2. It should avoid duplication of the publications activities of other professional groups.
3. It should confine its content to professional education subject matter of a kind that does not infringe upon the area of textbook publication which treats a specific body of subject matter in a structured, formal way.
4. It should not be exploited as an opportunity to promote and publicize one man's or one institution's philosophy unless the volume includes other similar efforts that have enjoyed some degree of popularity and acceptance in the profession.
5. While it may encourage and extend what is generally accepted as good in existing theory and practice, it should also actively and constantly seek to upgrade and modernize professional action in the area of industrial arts teacher education.

6. It can raise controversial questions in an effort to get a national hearing and as a prelude to achieving something approaching a national consensus.
7. It may consider as available for discussion and criticism any ideas of individuals or organizations that have gained some degree of acceptance as a result of dissemination either through formal publication, through oral presentation, or both.
8. It can consider a variety of seemingly conflicting trends and statements emanating from a variety of sources and motives, analyze them, consolidate and thus seek out and delineate key problems to enable the profession to make a more concerted effort at finding a solution.

Approved, Yearbook Planning Committee  
March 15, 1967, Philadelphia, Pa.

# Previously Published Yearbooks

1. *Inventory-Analysis of Industrial Arts Teacher Education Facilities, Personnel and Programs*, 1952. Walter R. Williams, Jr. and Harvey Kessler Meyer, eds.
- \* 2. *Who's Who in Industrial Arts Teacher Education*, 1953. Walter R. Williams, Jr. and Roy F. Bergengren, Jr., eds.
- \* 3. *Some Components of Current Leadership*. Roy F. Bergengren, Jr. *Techniques of Selection and Guidance of Graduate Students*. George F. Henry. *An Analysis of Textbook Emphases*. Talmage B. Young. 1954, three studies.
- \* 4. *Superior Practices in Industrial Arts Teacher Education*, 1955. R. Lee Hornbake and Donald Maley, eds.
- \* 5. *Problems and Issues in Industrial Arts Teacher Education*, 1956. C. Robert Hutchcroft, ed.
- \* 6. *A Sourcebook of Readings in Education for Use in Industrial Arts and Industrial Arts Teacher Education*, 1957. Carl Gerbracht and Gordon O. Wilbur, eds.
- \* 7. *The Accreditation of Industrial Arts Teacher Education*, 1958. Verne C. Fryklund, ed., and H. L. Helton.
8. *Planning Industrial Arts Facilities*, 1959. Ralph K. Nair, ed.
- \* 9. *Research in Industrial Arts Education*, 1960. Raymond Van Tassel, ed.
10. *Graduate Study in Industrial Arts*, 1961. Ralph P. Norman and Ralph C. Bohn, eds.
- \*11. *Essentials of Preservice Preparation*, 1962. Donald G. Lux, ed.
- \*12. *Action and Thought in Industrial Arts Education*, 1963. Ethan A. T. Svendsen, ed.
13. *Classroom Research in Industrial Arts*, 1964. Charles B. Porter, ed.
14. *Approaches and Procedures in Industrial Arts*, 1965. G. S. Wall, ed.
15. *Status of Research in Industrial Arts*, 1966. John D. Rowlett, ed.
16. *Evaluation Guidelines for Contemporary Industrial Arts Programs*, 1967. Lloyd P. Nelson and William T. Sargent, eds.
17. *A Historical Perspective of Industry*, 1968. Joseph F. Leutkemeyer, Jr., ed.
18. *Industrial Technology Education*, 1969. C. Thomas Dean and Nelson A. Hauer, eds.  
*Who's Who in Industrial Arts Teacher Education*, 1969. John M. Pollock and Charles A. Bunten, eds.
19. *Industrial Arts for Disadvantaged Youth*, 1970. Ralph O. Gallington, ed.
20. *Components of Teacher Education*, 1971. Willis E. Ray and Jerry Streichler, eds.

\* Out-of-print yearbooks can be obtained on microfilm and in Xerox copies. For information on price and delivery, write directly to University Microfilms Inc., 313 N. First Street, Ann Arbor, Michigan 48107.



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# Preface

The basic stimulation for the present volume came from a suggestion by Ralph C. Bohn, Past President of the American Council on Industrial Arts Teacher Education, during the time he served as Chairman of the Yearbook Committee. In response, a group of industrial arts teacher educators at Purdue University began work on an outline for the proposed yearbook in early 1968.

When the proposal was first presented to the Yearbook Committee in Minneapolis, the plan was to investigate industrial arts programs for the junior high school. As work progressed during the intervening years, it became clear that the yearbook should focus upon the learners to be served by the educational program. From this perspective, primary importance is attached to the provision of an industrial arts program to meet the educational needs of early adolescents, whether the program is conducted in an elementary school, a middle school, a junior high school, or a senior high school.

The publication of the yearbook represents the culmination of several years of effort by the group of authors represented in these chapters. Many others have contributed to the evolution of the ideas expressed here. A number of writers are cited in direct quotations; others are recognized in the lists of references. Innovative practitioners have developed outstanding programs and have permitted us to describe them for the readers. Still other professionals have exerted vitally important but unrecognized influences upon our writing and teaching.

Chapters have been prepared by three of my Purdue colleagues: Joseph J. Carrel, Lloyd D. Neher, and Alan R. Suess. John P. Schenck, author of Chapter II, was formerly associated with Purdue, as was Darrell R. LeBlanc, who assumed primary responsibility for the description of the program in Edmonton, Alberta. Discussions with other colleagues and with students have

helped to formulate many of the position statements and to sharpen thought on controversial points.

A word of editorial gratitude to the authors, who prepared chapters of exceptional merit, and to the practitioners who created innovative programs, permitted visits in their schools, and checked reports for accuracy. Purdue University has been most generous in its encouragement and support at all stages in the preparation of the manuscript.

It is with sincere appreciation that I acknowledge my indebtedness to the large number of individuals who assisted at various points in the project. It is hoped that the resultant volume will be useful to industrial arts educators as they plan programs for early adolescents.

Daniel L. Householder

# Industrial Arts for the Early Adolescent

*Daniel L. Householder*  
*Purdue University*

The overriding purpose for the present volume is the improvement of industrial arts education for the early adolescent in contemporary society. Industrial arts has a long and honorable history as a school subject. It has received its fair share of support from administrators and educators in other fields, as well as from laymen of various persuasions. There can be little doubt, however, that there is need for substantial improvement in the field. Critics and friends alike have suggested changes in emphasis, variations in content coverage, and alternative purposes for the program; many of these are explored here.

## THE LEARNER

Early adolescence is the time of life when becoming begins to take shape as being. The bud of the self starts to blossom in the turmoil of the societal environment; the horizon of consciousness extends toward the boundaries of human existence. As the child moves inexorably toward maturity, he is confronted by a myriad of alternatives. Education may facilitate his maturation, clarify his confusion, stimulate his imagination, and maximize his alternatives. Or, it may retard his development, confound his understanding, stifle his creativity, and restrict his choices.

Personality development proceeds rapidly during the early years of adolescence. The individual clarifies his perceptions of himself and begins the formation of a relatively stable interest pattern. As experiences provide a foundation for further development, the uniqueness of the early adolescent becomes apparent and assumes an important place in his selection of activities. By the time the individual moves into the later years of adolescence, the personality is quite well developed, with a close resemblance to the adult personality.

Education is of crucial importance during the early adolescent years. During this time, young people consciously and unconsciously formulate tentative decisions relative to their interest in further education as it is represented in the formal schools. Students investigate likely career opportunities of interest to them, either openly in discussions in school and among their peers, or covertly as they observe and learn about the contemporary world. As the early adolescent progresses through the educational system, he may use his experiences to assist him in his adjustment to education, his selection of potential career opportunities, and his personality formation. On the other hand, the school may retard or restrict his understanding of careers, inhibit his personality development, and tacitly encourage him to look outside the educational enterprise for stimulation, hope, and understanding.

### THE TEACHER

In a complex educational system like ours, the teacher must fulfill many roles. (Inlow, 1963) Teachers have traditionally been viewed as authorities in their fields, as examples to the youth of the society, and as individuals responsible for meeting the routine requirements of day-to-day school operation. Teachers are expected to build the community, to conserve and transmit the culture. The teacher is also a learner, one who does not come equipped with all the answers; yet one with the security to search with his students for expanding knowledge.

Teaching involves "staging" the learning environment, serving as "leading man," a storyteller attempting to stimulate students to their own accomplishments. The teacher must bridge the "generation gap," yet serve as confidant and friend as he guides, teaches, and inspires students through their developmental years. (Pullias and Young, 1968)

The classroom teacher is the primary change-agent in the educational process. His direct daily contact with the learner puts him in the position of maximum leverage in promoting improvement or in maintaining the status quo. Whether he can avoid his responsibility for professional initiative is a moot point; whether he should continue to act as in the past is a redundant issue. As Pucinski notes: "The crucial question for the seventies is two pronged: it asks whether most educators are ready to change and, even more fundamentally, whether the nation has sufficient perseverance, patience, and commitment to support one of its key institutions in the throes of transformation." (1971, p. 8)

Unfortunately, there are few concrete guidelines in the identification and preparation of teacher education candidates. While there are many prescriptions, few have been substantiated. "Despite the crucial importance of the problem and a half-century of prodigious research effort, very little is known for certain about the nature and measurement of teacher personality, or about the relation between teacher personality and teaching effectiveness." (Getzels and Jackson, 1963, p. 574)

Industrial arts teachers fulfill a major role in the transmission of the culture. They communicate subject matter about industry-technology which is basic to literacy in contemporary culture. They can no longer content themselves with being hewers of wood and forgers of metal with more concern for the characteristics of the materials than for the attributes of the learners.

### THE PROGRAM

As a program of study in the American school, industrial arts has been most widely available during the junior high school years. While there has been some interest in industrial arts in the elementary school, and while most senior high schools have provided a broad program, the preponderance of the industrial arts enrollments have been in grades seven and eight. It is in these grades that industrial arts is most often a required course, at least for boys, and frequently for girls as well.

As middle schools have come into being, they have tended to encompass the grade levels which have traditionally provided the largest enrollments in industrial arts. However, they have not

yet produced radical change in the industrial arts programs for these grades. Rather, they have tended to adopt the existing seventh- and eighth-grade industrial arts programs with relatively little adaptation, even when the same activities and subject matter are moved to a lower grade level.

For many years, industrial arts offerings for early adolescents were quite consistent in terms of content and clientele. Junior high school students were enrolled in woodworking, drafting, and metalworking courses, with an occasional foray into electricity, printing, and power mechanics. Substantial effort has recently been devoted to the up-dating and development of the industrial arts program. Most of the industrial arts curriculum projects have concentrated upon the organization of a common learnings program for early adolescents.

Attention to the industrial arts curriculum has been widespread. Major funded projects have produced significant change across the national scene, not only in their pilot and demonstration centers, but also in schools which have adopted the approaches and procedures of innovative projects. Locally inaugurated efforts have also produced some exciting courses; a few of these are described in some detail in Chapter VII.

### TEACHER EDUCATION

In the most recent ACIATE Yearbook, Ray and Streichler (1971) provided a comprehensive, analytical study of the preparation of industrial arts teachers. Their volume gives detailed attention to the identification and organization of content for the industrial arts teacher education program, and provides an inclusive discussion of instructional methodologies. No attempt is made to duplicate their efforts here. The present work considers teacher education problems as they are related to the industrial arts program for the early adolescent. As the respective authors have explored the developmental needs of the early adolescent, the institutional settings in which his education occurs, and the types of programs available to him, the discussions have implications for industrial arts teacher education. These, of course, are included as one of the potential contributions of the present volume.

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# Early Adolescence: The Revolution Within

*John P. Schenck*  
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Most human beings progress through a developmental continuum that culminates with adult status. Some may linger overly long or even fixate at any given point on the continuum, but most make the transition sooner or later. This developmental continuum is commonly perceived as being composed of various stages, with distinct developmental characteristics attributed to each stage. Less distinct are the precise boundaries of these stages, the external and internal forces which influence them, and their ramifications for each individual. It must be pointed out, too, that age-stage theory is not without critics. Rogers (1969) points out that there is a serious lack of phenomenological evidence concerning age-stage theory, but that educators and the business world subscribe wholeheartedly to it. However, to the extent that age-stage development is defined as real, it will be real in its consequences; therefore it will be given credence in this chapter.

Various observers have attached nominal labels to most-often-noticed developmental stages; the labels are usually a function of the *observer's* predisposition to interpret development in physiological, intellectual, and/or personality terms. Whether the labels are perceived as reflecting reality is a function of the *critic's* predisposition to subscribe to one or more schools of thought about human development. For example,

observers who subscribe to the psychoanalytic interpretation of human development as personality stages (oral, anal, urethral, phallic, latency, and genital) tend to take little interest in human development as intellectual stages, *a la* Piaget. The same may be said of Piagetians' attitudes toward psychoanalytic interpretation. The result of this kind of division of perception is that the individual is dealt with in terms of discrete concerns rather than as a total organism. An exception may be the recognition of psychomatic disorders as a step toward treating the whole person.

It is probably safe to assume that any physiological, intellectual, or personality stage can be subsumed under one or more of the broader stages of human development: childhood, adolescence, and adulthood. But this generalization generates its own dilemma, namely the location of the parameters of adolescence. Which is to say, when does childhood end and adolescence begin? American culture provides few puberty rites to signal this transition. To the extent that this chapter has to do with early adolescence, a working definition of adolescence must be formulated.

## DEFINITIONS OF ADOLESCENCE

### **Etymological**

*Funk and Wagnalls Standard Dictionary* (1965) records that "adolescence" is derived from the Latin verb, *adolescere*, meaning to grow up. But this definition serves little purpose; it confirms the obvious and lends itself to begging the question.

### **Biological**

Adolescence is traditionally defined in terms of body changes (Tanner, 1969). The adolescent growth spurt, for example, occurs on the average from twelve and one-half to fifteen years of age for boys; for girls, from ten and one-half to about thirteen. Accompanying or preceding this muscular and skeletal growth is the development of the reproductive system. For boys, reproductive-system development is signaled by acceleration of growth of the testes and scrotum; for girls, the beginning of growth of the breasts and/or appearance of the menarche. It should be noted that an early-maturer may complete his biological adolescence before a late-maturer of the same age has begun his.

### **Sociological**

The sociological theory of adolescence, as represented by Davis (1960), concentrates on social institutions and the adolescent's role and status in determining his own future. Adolescence is a period in life when society no longer regards the individual as a child, but refuses to extend adult status.

The position of adolescence is determined sociologically by four factors: (1) occupational placement—the individual is considered an adolescent while in training for an occupation, and an adult when he works full-time at that occupation; (2) reproductive control—healthy boy-girl relationships are expected, but adolescent status is, and virtue must be, maintained until after marriage, when adult status is conferred; (3) authoritarian organization—the emancipation of the individual from the authority of his family implies adult status; and (4) cultural acquisition—matriculation in the educational process for the learning of cultural rudiments implies an adolescent status.

### **Chronological**

Hurlock (1956), for example, defines adolescence as the age period from thirteen through twenty-one years. This age range is fractionated further: preadolescence from ten through twelve; early adolescence from thirteen through sixteen, and late adolescence from seventeen through twenty-one. It is apparent that a chronological definition is as fraught with shortcomings as others, but it has great support in the legal system, as in voting eligibility, susceptibility to being drafted, and school-leaving age.

### **Working Definition**

While the schools keep no records on the growth of testes and breasts and show little interest in marriage or employment status in the middle grades, the use of student age as the criterion of educational eligibility and capability is ubiquitous.

For the purposes of this chapter, adolescence is taken to mean those years from age ten through sixteen, or from about fifth or sixth grade through the common legal dropout age; early adolescence becomes ages ten through thirteen. The definition admittedly tends to be circular, but it has utilitarian value

in permitting comparative approximation of an individual's maturation.

There is evidence to indicate that maturation problems which previously manifested themselves at adolescence are now appearing at what used to be considered preadolescence. Mead (1965) points out that a salient characteristic of the last two decades has been the diffusion downward in age level of dating, going steady, pairing-off (as opposed to one-sex friendship), and in emphasis on vocational goals, criminal behavior, competitive athletics, religious affiliation, and permission to spend money on an increasingly grander scale.

It is immediately apparent that a youth can be simultaneously a child, adolescent, or adult, depending upon the definition of these stages to which one subscribes. It may be, however, that when the youth begins perceiving others as competitors for scarce resources, childhood is at an end (Sullivan, 1953).

A word of caution! The reader should not assume that this chapter promotes or subscribes to the notion of mind-body dualism. Physiological and intellectual attributes are dealt with separately only as a matter of convenience.

## EARLY ADOLESCENCE: INTERESTS AND NEEDS

### Evolution of Physiological Interests

The latter years of childhood find the child relatively content within a familiar body. They mark ". . . the culmination of a decade of fundamental development which began with the prenatal period." (Gesell, Ilg, and Ames, 1956, p. 37) The child's interest in his body is less motivated by vanity than the activities in which it enables him to engage: jumping, running, swimming, bicycling, and childhood games. In fact, the child usually exhibits little interest in personal appearance, eschewing soap and water and preferring to wear old familiar clothes. However, the slight, uncoordinated boy may be excluded from group activities by his peers, and may become timid, introverted, and perhaps scholarly (Miller, 1967).

Early adolescence brings a renewed, almost overpowering interest in the body and body image. Rogers (1962) mentions several images each individual has and which are especially vivid to the adolescent: (1) *own-body image*, or the way one perceives his body; (2) *ideal-physical-self image*, or the physical

traits one believes most suitable to his ideal self; and (3) *day-dream portrait*, or the physical self one assumes in fantasy. Adolescents are less satisfied with their bodies than with any other part of their lives (Jersild, 1952). Given a choice, most adolescents would make certain changes in their bodies. Blackheads and pimples are a primary concern of both male and female adolescents (Frazier and Lisonbee, 1950). Real or imagined physical defects can be devastating; deviations from peer maturation patterns appear to be fatal. Youths tend to evaluate their maturing bodies in terms of what their adult bodies must be, without knowing that adult standards will be different. Physique is also evaluated in terms of what is believed to be attractive to the opposite sex. Boys want to be broad shouldered and narrow hipped, while girls want ample busts and flat stomachs. Shortness in a male is viewed by him as tantamount to failure; tallness in a girl may be perceived by her as catastrophic.

Concern with clothing and other adornment is closely related to the preoccupation with the physique. In a study of clothing and appearance of adolescent girls, Silverman (1945) found that all age groups from seven to twelve conformed closely to the style of dress for daily wear. Use of makeup increased with age; lipstick and powder were used as early as age twelve. Economic differences seemed to appear only with luxury items. In his study of adolescents from Midwest high schools, Coleman (1961) noted that both clothing and grooming were seen by many of his respondents as important to membership in the "in group."

While it may be easy for adults to view youths' physiological interest as simply a passing phase, obvious deviations in physiological maturation or development can precipitate serious problems. Frequent examples include adjustment difficulties, asocial behavior, tics, nailbiting, enuresis, depression, and hypochondria (Frisk, Tenhunen, Widholm, and Hortling, 1966).

### **Intellectual Interests**

Many intellectual interests of late childhood are restricted by a predisposition to deal mainly in concrete and here-and-now terms; the ability to deal with hypotheses and probabilities has not yet matured. The model of the same-sex parent is now modified and supplemented by the addition of other adults.

After the youth has been in school, intellectual interests shift to outside the home.

Late childhood brings a decreased liking for academic school work and an increased interest in social, athletic, and mechanical activities (Jersild and Tasch, 1949). "Boys who are skillful with their hands are busy drawing gadgets, architectural plans, jet planes, and rockets. Others draw elaborate pictures of battles, or violence, or cars and trains, with running commentaries." (Gesell, Ilg, and Ames, 1956, pp. 57-58) They are vitally interested in how things work and will dismantle almost anything in order to examine it, with less concern for putting it back together. They require specialized tools to accomplish their tasks, insisting upon a carving knife rather than a razor blade for model building. There is a fascination with the physical world as they seek to develop extensions of themselves to accomplish tasks which their limited physical abilities would not otherwise permit.

Some concern is shown for future education and vocation. The father's and mother's occupational and educational attainment serve as the principal models: sons of professional fathers aspire to professional callings, while sons of laborers think in terms of manual work and the trades (Tyler, 1955).

Aesthetically, the child's standards are approaching those of the adult. The basis for aesthetic choices is purely arbitrary in many instances and shows the cumulative effects of continual incidental exposure to, and awareness of, socially approved standards (Thompson, 1946). As pointed out by Voss (1936), aesthetic standards in children can be altered by a guided series of experiences in objective exercises and explanation.

The child's world of values is largely unstructured because of his insufficient frame of reference. However, parents and other authority figures expose him to both conscious and unconscious indoctrination. Prejudice toward groups appears in late childhood, usually as the reflection of learning from parents (Radke-Yarrow, 1952). With increased exposure to a broader spectrum of society the child's values tend to reflect those of the society at large.

Intimately related to the child's values is his notion of personal morality: his concerns with the proper ends of activities and aspirations, with good and evil, and with responsibility for behavior (Ausubel, 1958). Moral values are obtained from parents, but in accepting these values, the child may not feel

obligated to control his own behavior accordingly (Ausubel, 1955). Hitting, for example, is seen as bad when others engage in it, but not when it leads to gratification of the child's own impulses (Fite, 1940). As the child's world of experiences expands beyond the family, the idea of one-way obligation and adult respect gives way to the notion of reciprocal respect (Piaget, 1932).

Preadolescent interest in the opposite sex is usually ambivalent, particularly among boys. They are uneasy in close relationships with girls and tend to take refuge in the company of peers. But boys are sensitive to girls' interests in them. Sexual feelings are hidden behind a facade of teasing and aggressive behavior. The preadolescent girl is not very feminine in her pursuit of attention from boys. Some girls may find a temporary haven in the role of tomboy or horseback-riding enthusiast (Group for the Advancement of Psychiatry, 1968).

The early adolescent's intellectual interests are, to a great extent, an extension of those of the late child's, but with increased concern for the future and for his impending adulthood. Real interest in school subjects tends to lag, though the consequences of poor scholastic performance become more apparent. A study by Adams (1964) indicated that a principal personal problem identified by early adolescents had to do with academic difficulties. Many youths will overachieve as a result of parental mobility aspirations for them (McClelland, Atkinson, Clark, and Lowell, 1953). Occupational aspirations are also intimately connected with mobility aspirations, and there is reason to believe that achievement motivation is predictive of the general level of occupational aspiration and the quality of career patterns (Borow, 1968).

It is doubtful that most adolescents view vocational plans with reality clearly in mind. Caplow (1954) identified five adult influences that color the early adolescent's vocational perceptions: (1) white-collar work is superior; (2) self-employment is superior; (3) clean occupations are superior; (4) the importance of a business occupation depends upon the size of the business; and (5) personal service is degrading—better to be employed by an enterprise than do the same work for an individual. If this kind of snobbery is being perpetrated, youths are being done a grave disservice. Their perception of vocational

success is not only distorted, but only a few will be able to achieve these criteria of success, leaving the remainder dissatisfied with their jobs. If our society advocates the nobility of work, then it must be willing to extend nobility to all occupations, without reference to relative superiority or functional importance.

Coleman (1965) claims that youth are oriented to a peer culture which advocates social and athletic values to the exclusion of more serious considerations. The contemporary values of young people are daily documented by the media and lamented by many parents. Much of the dissonance is a result of deviations from parental values—political, social, and economic. But the values of the early adolescent remain largely a reflection of his parents', except in many sexual matters where the peer group is dominant. Goodman (1968) maintains that the values presented by schools and the general culture include these: (1) a uniform world-view; (2) the absence of any viable alternatives; (3) confusion about the relevance of one's own experiences and feelings; and (4) a chronic anxiety, so that one clings to the single world-view as his only security. But as the youth's experiences broaden outside school and family, he begins to perceive real and assumed discrepancies between adult pragmatism and his own idealism, between national ideals and national practice.

Adolescence is a crucial time for the fate of personal morality (Douvan and Adelson, 1966). During early adolescence, initial efforts are made to formulate an individual moral philosophy which is not a carbon copy of what one has been told, but a set of beliefs relevant to one's own existence. The sphere of the individual's moral interests may include national and international problems, the basic meaning of human life and existence, a sense of personal identity, sexual identity, and role-appropriate behavior (Eisenberg, 1965). As Bossard and Boll (1966) observe, the crucial point in this part of life is that the rapidly growing, but not yet mature person is living in three social worlds: the family world, that of his peers, and an adult non-family world. A multiplicity of conflicting or vague inputs play havoc with the youth's development of a personal morality and/or a life philosophy.

### **Evocation of Shifts in Interest Patterns**

The shift from passive body-image interests to active body-image interests is elegantly explained by Ausubel:

Ordinarily, during most periods of life (e.g. from childhood to preadolescence), the body image changes imperceptibly because the body itself changes in this way. The small changes in appearance and quantitative increments in height and weight are easily absorbed in the prevailing image the child has of his own body; no radical revisions are necessary. During adolescence, however, conscious and wholesale restructuring of the body image is necessary to account for drastic changes in size, body proportions, primary and secondary sex characteristics, and facial appearance. (1958, pp. 505-506)

The media continually bombard the early adolescent with commercialized notions of how his or her body should appear in terms of sex appeal or sheer masculinity or femininity. To the extent that early adolescence is a period of developing self-concept, the youth may attempt to emulate these commercialized notions. Also, television and the movies present both real and fictional persons as models for imitation. Both gender-role and sex-role identity are necessary for the youth to move from a homosexual orientation and same-sex preoccupation to heterosexual and opposite-sex associations.

The psychoanalytical position on the evocation of physiological interests is that they are essentially a problem of sublimation (Wolman, 1968). The sexual impulses that result from hormonal secretions and reproductive organ development are held in check by a host of ego defenses. A particular defense may be employed tenaciously for a time before it is replaced by another, or different defenses may be employed in rapid succession so that the youth's behavior appears erratic and unpredictable. A pubertal boy may suddenly become immersed in a hobby to such a degree that his parents complain that he is continually in his workshop. Youngsters now take an intense interest in modesty, and find parental jokes with sexual implications offensive. Ausubel (1954) takes to task the psychoanalytic contention that most youthful activities and interests are sublimated products of sex drives. A youth becomes involved in a host of activities and interests as a natural outcome of his social activities. Since other motives seem to be apparent to explain the activities and interests, it is unnecessary to attribute them to

repressed drives. It is just as likely that the boy hits a baseball for applause and admiration as for a feeling of sexual gratification.

Dress, grooming, and general appearance of the early adolescent are still largely under the control of the parents. But the youth is under increasing covert pressure from his peers to conform to current styles and fashions. Parents continuously hear of the ubiquitous and ephemeral "everyone" who currently dictate what the youth must wear and how he must be groomed.

Evocation of the shift in intellectual interests is essentially a matter of the struggle for independence from the family as the primary reference group and a natural outcome of the increased capacity to think abstractly and to evaluate in terms of "should be" and "why." (See the following section on abilities.) These two general factors subsume such more specific ones as the importance of discrepancies between the world at large and the home, general rules of conduct, psycho-social intimacy with the opposite sex, general vocational goals, and occupational preparation (Gardner, 1959). An increased ability to handle abstractions permits projection into the future and the weighing of fundamental alternatives to action.

Movement into the world at large evokes a shift in concern for personal morality and presents the early adolescent with various instances of double standards in behavioral ethics. Halleck posits the following as a representative sample of contradictory signals received by young people as they are initiated into the ways of the world.

- |                                 |  |
|---------------------------------|--|
| 'A man's family comes first.'   | 'Don't bother me now, I'm too busy.'                               |
| 'Adhere to your principles.'    | 'I'd like to fight this issue, but what will the neighbors think?' |
| 'Control your sexual impulses.' | 'Betty is already 13 and I worry; she never goes out on dates.'    |
| 'Alcohol is bad for you.'       | 'Don't make so much noise; this hangover is killing me.'           |
| 'We love you for what you are.' | 'If you disgrace us, we'll never forgive you.'                     |

'A man should go to church and he should fear God.'

'I'd go to church more often but the minister is so dull.'

'You must help your less fortunate neighbors.'

'Taxes, taxes, they ought to crack down on those welfare chiselers.'

'You are your brother's keeper.'

'Keep your nose clean and keep out of other people's troubles.'

(1967, pp. 215-217)

Although the notion of a "youth culture" has been rejected by Elkin and Westley (1955), such writers as Folson (1943) and Davis (1944) subscribe to it. The principal significance of such a culture is, of course, the power to elicit conformity to youth norms. This power is possible because of the culture's ability to reward the individual with status and prestige, if not with money. Pearson (1958) refers to a "compulsive conformity" required of the members of the youth culture. Adult norms acquired in the home are mediated by the youth culture; norms relating to sexual behavior are especially susceptible to modification.

Relationships between young people tend to be class selective. Even here, the youth culture alters the adult norm by de-emphasizing economic differences and including a broadened class-spread (Smith, 1962). The extent to which the youth culture influences those interests and activities related to industrial arts is uncertain. Specific manipulative skills (drawing and sketching, model construction, or home repairs) and cognitive skills (solving puzzles, memorizing unrelated facts) may be valued by a youth group and thus lead its members to seek sources of proficiency. It may be hoped that industrial arts is perceived as such a source. To the extent that industrial arts is viewed as contributing to adult status, the peer culture will value it.

Peer pressures have not attained full strength during early adolescence. They are, however, exerted in increasing amounts as the distance between youth and family grows. Parents tend to be concerned when they cease to be the sole arbiters of their children's values and norms, but independence is a necessary and normal part of the growing-up process.

### Characteristic Needs

The current controversy over the validity of youths' needs as identified by adults is a legitimate one, but not so clear-cut as either side would have one to believe. So, it is with the full understanding that personal convictions do not necessarily reflect reality that the following discussion of needs is included.

*Physiological Development.* Havinghurst (1953) maintains that youths need to accept their physiques and use their bodies effectively. This is not to say that youths need to be fatalistic about attempts at self-improvement. It only means that they must reconcile themselves to the reality that a self-image is attainable only if it falls within the limits imposed by genetic endowment. The boy who stands in front of a mirror and envisions broad shoulders, but whose bone structure dictates otherwise, is bound to disappointment if he does not accept the factual status of his limitations and make peace with himself. He is a potential target for every nostrum and regimen that promises a body beautiful. The unendowed youth may, of course, seek self-improvement, but there comes a point at which great hopes and expectations must be reconciled with reality.

Erickson (1963) posits the notion of an "industry vs. inferiority" stage which occurs in late childhood and/or early adolescence. Youths need to gain a sense of the technological ethos of their culture—a respect for industry and tools. Industry involves working with others, the division of labor, and differential availability of opportunity. There are dangers, however, inherent in this stage: danger that the youth will begin to believe that his skin color, parental origin, religion, and social class, rather than his desire to learn will determine his worth as a worker and a person; danger that "worker" will become his only role in society, that efficiency may be the sole criterion of his worthwhileness, and that unquestioning reverence for the dogmas of technology may place him at the mercy of those who are in a position to exploit it.

If youths are to be denied heterosexual activities, they need other physical activities through which they can release their increasing sexual energy and drive. Such activities also serve to release tensions and anxieties brought on by the growth spurt and physical maturation. It follows, then, that youths need to know why they must defer sexual gratification

when they may be biologically capable of it and when they are expected to act like adults in many other respects.

Early adolescents need realistic sex information in order to cope with their increased sexual awareness. Unresolved questions about psychosexual development abound: the origins of sex feelings; how sex feelings and problems affect males and females differently; the fairness of the double standard; and the amount of sex expression needed (Money, 1965). Something is grossly wrong when girls are unable correctly to interpret their menarche, and boys their first nocturnal emission.

*Educational Achievement.* Bruner (1966) observes that learning at all educational levels should not be dominated by strong extrinsic rewards and punishments, or learning becomes specific to the requirement of the particular learning task. This exemption from the achievement and performance pressures of our society is especially appropriate to youths in the middle schools. This exemption may be interpreted in terms of criterion-referenced rather than norm-referenced evaluation, individualized learning, nongraded schools, or the provision of opportunities for each youth to be successful in some way. Rebuttals to this position are legion. Probably the shabbiest is the idea that "these kids are going to live in a competitive society, so they had better get used to it."

The principal rationale for exempting middle school students from achievement and performance pressures is based upon the inadequacy and intrinsic unfairness of norm-referenced evaluation during early adolescence, a period of extreme individual differences. According to Eichhorn,

The concept upon which the middle school is built is transescence, that is, the period in human development prior to the onset of puberty, and which extends through the early stages of adolescence. It is for the transescent that the middle school is designed. (1966, p. viii)

which is to say, the middle school should be molded to the students, not the students to the school. It is too often the case, as pointed out by Goodman (1964), that children are not only compelled to go to school, but also compelled to become what the schools want them to be through a rigidly conceived notion of what all youths need.

Yet, Coleman (1961) maintains that competition is a motivating device. He indicates that attempts to eliminate competi-

tion are based upon the failure to recognize three fundamental concepts. (1) Competition is a means of gaining respect and recognition from others. Removal of academic achievement as a basis of evaluation only serves to shift competition to non-academic activities. (2) Changes in behavior never occur without a challenge. That is, there must be a perceived discrepancy between an aspired for state and one's present condition. (3) The ill effects of comparing achievement are not the result of competition, *per se*, but rather of the structure of competition. The trauma occurs when the individual fails relative to those around him.

Coleman feels that competition need not be eliminated, only restructured. Substitution of interscholastic and intramural competition for interpersonal competition is one such approach. Intellectual games, problems, group projects, and other activities of a similar ilk could provide the necessary stimulation. But such an approach would call for a change in the philosophy that each student's achievement be graded in every subject. The subjective judgment of teachers would also need to be avoided in judging competition.

Regardless of the type and degree of competition or achievement comparison, the school needs a curriculum within which educational achievement will occur. Several such middle school curricula have been suggested. Alexander and others (1968) posit a three-fold curriculum structure: (1) personal development; (2) skills for continued learning; and (3) organized knowledge. Industrial arts is classified, in general, under personal development, and specifically as a vehicle for awakening individual interest. It is viewed as an exploratory, hands-on activity.

Moss (1969) suggests a four-fold arrangement: (1) individual skills; (2) English, social studies, science, mathematics, and foreign language; (3) the arts; and (4) health, recreation, and physical education. Because of its emphasis and the term "arts" in its title, industrial arts is included in the "arts" group, although its current emphasis on technology makes it eligible for inclusion in the second group. The essential concerns of industrial arts would be tool-use skills, correlated construction activities, and technology.

Still another paradigm is presented by Eichhorn (1966), who recommends two curriculum areas for the middle school: (1)

the analytical, which includes mathematics, language, social studies, and science; and (2) physical/cultural, which subsumes fine arts, practical arts, cultural studies, and physical education. Industrial arts does not emerge as an instructional area in this plan.

Steeb (1970) perceives three levels of organization in the industrial arts program for the early adolescent. At the first level, the exploratory phase, students explore, experiment, and become acquainted with tools, materials, two- and three-dimensional activities, design concepts, and self-assessment techniques. Learning activities in this phase may relate to broad concepts and to other school subjects. The second phase, "preindependent," emphasizes greater tool and learning proficiency, provides less direction and guidance from the teacher, and introduces the concept of self-evaluation. The third level features independent, self-directed study and the election of activities which require high proficiency with a variety of tools and materials.

To the extent that the middle-school movement is relatively new, a diversity of opinion about structure and organization is to be expected. To be effective, all middle-school curriculum paradigms must be oriented to the concept that education should serve in the future. And the future for contemporary youth in early adolescence will be markedly different from the present.

*Psychological Stability.* The media are replete with accounts of apparent psychological instability in youth, as interpreted by adults. Drug use easily leads the list of behaviors characterizing such instability. Reams of paper and thousands of word-hours are devoted to explaining the use of drugs, but no sufficient and necessary conditions have been identified to justify the activity. It is doubtful that the status of early adolescence is a necessary condition for initial use of illegal drugs. At that stage, stability is commonly defined in terms of behavioral norms formulated by the schools and/or parents.

It is important to recognize that schizophrenia and manic-depressive psychosis often first appear in adolescence (Eisenberg, 1965). Even so, great care must be exercised in diagnosis of such instability patterns, for serious social consequences

may result, including withdrawal from school or institutionalization.

As the early adolescent moves outside the close supervision of his parents and into the sphere of influence of the peer culture, instability in the form of delinquency also becomes more probable. Caution must be exercised in classifying behavior as delinquent simply because it is not socially approved. For one thing, such classification can lead to a self-fulfilling prophecy. For another, the official stamp of "delinquent" is a severe penalty to levy for youthful exuberance and naivete. Bandura (1964) points out that much of the expectation that youths are unstable has several sources, including overinterpretation of superficial signs of nonconformity, mass media sensationalism, and generalizations from samples of deviant youths. In short, adults are too willing to accept storm and stress as an inevitable part of puberty.

*Social Acceptance.* The need for social acceptance in the early adolescent is probably not much different than in the adult. Both need to belong to a reference group that shares common values and provides protection against threats to self-esteem. The extent to which youths will go to "belong" may be lamented, but upon honest examination, adolescent practices differ very little from those of adults: stylized clothing, stereotyped grooming, and repression of unpopular opinion. In general, both age groups find it advantageous to assume an acceptable facade. Although this acceptable behavior technique may be similar for adults and young people, the specific content of the behavior often differs radically. The differences over what constitutes acceptable grooming and clothing are well chronicled, and unpopular opinion among adults may well be popular opinion among youths.

To the extent that a democratic society permits considerable leeway in individual behavior, what constitutes acceptable behavior may be irrelevant. What is relevant is the ability to determine the price of social acceptance based on irrelevant variables. To this end, the school must deal with early adolescents in terms of their worth as human beings, not as high-ability, low-ability, or no-ability students.

### EARLY ADOLESCENCE: ABILITIES

#### Physical

Two indices of physical ability are available for comparison purposes: (1) adult equivalency, or how closely an individual approaches an adult norm, and (2) mean-age-group equivalency, or the comparison of an individual's performance with his age-group norm.

The preponderance of evidence on the physical abilities of early adolescents has to do with such activities as volleyball throwing, running, jumping, beam balancing, and rope climbing. Only with difficulty will measures of physical abilities directly related to industrial arts be found. One piece of evidence is offered by Fuzak (1958), who found that success in industrial arts was directly related to physical maturation. Bortz (1967) observed that differences in the proficiency of seventh, eighth, and ninth graders in performing specified tasks with a modified hammer were related to strength and, in particular, to shoulder extension strength.

Muscular and skeletal development provide the wherewithal for motor skill development. Gross motor learning is directly related to body build, skeletal maturity, and other individual physical characteristics (Sills, 1950; Seils, 1951). Complex motor learning depends on psychomotor intelligence and is not related to physical abilities and gross motor skills (McGraw, 1949). Phylogenetic skills are not dependent on practice, but develop as the individual develops and genetic influences permit. That is, these motor skills develop as a part of maturation and do not require practice to develop. Walking, grasping, and crawling are examples.

Ontogenetic skills, such as those involved in the use of tools, machines, and instruments, are dependent upon practice and appropriate conditions for their development (Ausubel, 1958). Premature practice is valueless if the individual's neuromuscular capabilities are not equal to the task. It follows, then, that early adolescents may not be physically ready to perform some of the activities required in industrial arts.

To the extent that early adolescence is the beginning of extreme differences among individuals, it is not fair or realistic to expect equivalent physical abilities in all individuals of a specific age group. There is evidence also that youths whose

parents are over-protective tend to be fearful of physical activity and retarded in gross motor development (Baldwin, 1949). Caution should be exercised in generalizing from one gross motor ability to another. Positive but low intercorrelations among the various gross motor abilities indicate that such abilities are rather specific in nature (Hartman, 1943). It should be pointed out that sensori-motor learning in young children is unrelated to intelligence test scores (Munn, 1954). Irvine (1968) concluded that creative thinking ability is a distinct ability, apart from psychomotor ability, vocational aptitude, and mechanical reasoning ability. Such iconoclasm strikes at the foundation of a popular notion held by many teachers and administrators, namely that a student who cannot work with his head can work with his hands, and therefore should be successful in industrial arts.

### Intellectual

Piaget and his colleague Inhelder provide the most comprehensive writings about intellectual abilities and development currently available. Additionally, most of the current research on the intellectual development of childhood and adolescence takes a starting point in some way from the works of Piaget and Inhelder (Elkind, 1968).

Piaget (1950, 1962) posits the notion that the system of thought used in middle and late childhood is one of *concrete operations*, dealing with logical classes and with logical relations, but not with propositions or hypotheses. At about the age of eleven or twelve, the youth begins to employ a system of thought termed *formal operations*, dealing with reasoning on the bases of objects, hypotheses, and propositions. Early adolescence, then, is on the cutting edge of formal operational thought and an individual will be more or less capable of abstract thought.

The youth can take his own thoughts as an object and reason about them. He can arrive at many combinations and permutations which in fact may never occur. The young person cannot only differentiate between reality and appearance, he can differentiate between truth and falsity, that is, evaluate hypotheses against facts (Inhelder and Piaget, 1958). The formal-operational thinker is willing to reject an unworkable

hypothesis or notion and produce a more suitable one. This ability to differentiate between reality and thought arises from the ability to take into account all the possibilities of a situation.

Interpretation of graphic materials indicates still another way in which formal-operational thought is manifested. Shaffer (1930) found that it was not until the ages of twelve to fourteen that young people got beyond the literal meaning of a cartoon to its metaphorical interpretation. Vernon (1948) found that it was only toward the ages of eleven or twelve that children really interpret pictures in terms of motives and feelings of the characters depicted. Harris (1964) found that as children grow older, their drawings become more specific to the extent that more and more details are accounted for. It would seem, then, that industrial arts teachers should exercise caution when presenting graphic materials such as safety posters to early adolescents, lest the subtlety, and thus the message, is lost.

At first blush, age-stage theory seems to be an elegant means of reckoning with physiological and intellectual abilities. It may well be a sound explanation, in fact, at the upper and lower extremes of maturation. But at the level including early adolescence, there are problems in direct application of the theory. The only thing that can be stated with certitude is that each youth's level of development will exactly equal his own level of development at the moment.

### **Expectations**

The early adolescent is expected to fulfill a host of expectations: societal, peer, educational, and personal. Society expects youths to be followers, while indicating to them that they will be the leaders of the future. They are expected to fit into the scheme of things, while maintaining a rugged individualism that may well be inimical to social progress. Youth are expected by society to assume appropriate sex roles based on a hunting economy, and irrelevant criteria for the assignment of tasks. Society expects young people to accept society because of the advantages it contains, while not admitting, on the same basis, the legitimacy of rejecting society because of its disadvantages.

Peers expect the young person to accept their conformity and to reject parental conformity. They expect him to experiment with adult behavior and then retreat into childhood status

when confronted with the consequences of his behavior, rather like the young man who killed his parents and then expected mercy from the court because he was an orphan. In short, the peer group expects the individual to substitute one set of questionable norms for another.

The educational system expects the early adolescent to accept whatever he is told to accept. He is expected to structure his value system to give greater importance to the length of hair or skirt than to the quality of education. The schools expect young people to act as agents of social perpetuation rather than as agents of social change. The schools expect the early adolescent to accept a purposeless education and not to question established practice—the mindlessness identified by Silberman (1971).

The early adolescent himself has no idea what to expect. He is bombarded from all quarters with the expectations of others. They make contradictory demands on his time, energy, personality, capability, intellect, and credulity. He is expected to make sense of a world in which he has no influence, and to contain, with good grace, the revolution within.

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# Educational Purposes for the Transition Years

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Educational programs are, in many respects, much like space missions in their development and flight. Prior to launching a spacecraft, the purposes of the flight are carefully and specifically delineated. Based upon these purposes, the craft is designed and constructed, and its flight path accurately charted. After launching, the craft is stabilized in flight and its direction and attitude maintained automatically through its inertial guidance system. The flight is constantly monitored and corrections in direction or attitude are made in reference to the purposes of the flight by overriding the inertial guidance system sufficiently to put the spacecraft on the proper course.

The success of such a flight depends upon the development of clearly defined purposes, a vehicle with a configuration and systems designed expressly in reference to those purposes, a guidance system to hold the vehicle to its pre-determined course, and a monitor-override system to make corrections if the vehicle strays off course or if the purposes of the mission are modified for one reason or another.

The success of an educational program depends upon these very same factors. Any hope of success depends upon the development of clearly conceived purposes. But once in operation, the success of the program depends in no small way upon the ability of teachers and administrators to keep it on its charted path and to change paths when purposes indicate a change is necessary.

Even a perfunctory analysis of educational programs for youth in transition from childhood to adolescence would reveal that many programs launched today have essentially the same configuration as those launched fifty years ago. It would also reveal that many of them, new and old, have drifted from their intended paths, coasting along on their own inertia—some without a controlling sense of direction, and some with a sense of direction incongruous with the needs of the children the programs are to serve.

This is especially true of many junior high school programs, but middle school programs are not exempt. DeVita, Pumerantz, and Wilklow (1970) point out that the intended purposes and functions of the junior high school are just as valid today as they were when the junior high school concept was formulated in the early part of this century. However, the point is also made that those purposes and functions are not being implemented today in the junior high school. Several reasons for the failure are suggested.

In essence, their charge is that the junior high school has forsaken its role of easing the transition to high school by attempting to emulate the high school. Competitive athletics and the resultant concern for winning teams; big marching bands, complete with uniforms; and formal proms and social events better suited to the high school student are given as examples of such emulation. They further contend that the school often becomes impersonal, failing to make allowances for individual differences, asking the children to be adult beyond their years, and in the process stigmatizing many as failures. Additionally, the junior high school is charged with failing to take into account the new teen-age culture and the earlier physical and educational development of youngsters. Unrealistic demands "may be alienating students from educational achievement rather than easing their transition to the senior high school." (DeVita, Pumerantz, and Wilklow, 1970, p. 20)

On the other hand, the middle school, which is supposed to alleviate these ills, often finds itself in the position of emulating, in many ways, the existing junior high schools. One example may suffice to make the point. It is not at all uncommon to witness middle school industrial arts programs that are nothing more than junior high school programs commencing a year earlier.

Why should these situations occur? Why do educational practices often fall short of achieving theoretical purposes? Certainly not for lack of *statements* of purpose, for many excellent statements have been written. Why is resistance to educational change so strong? Certainly not for lack of evidence of the *need* for change.

Ryland Clary, in *Humanizing the School*, explains the situation as a matter of lack of intent to carry out educational obligations:

Intention considerably defines the job to be done; the school cannot afford to be witless about its purposes. However, a school can devise a full program without any important deliberations as to intent. After all, common practices, authoritative guidelines, textbooks, syllabuses, and bandwagon appeals are abundant.

A curriculum can be looked upon as an empty schedule to be filled. To fill it without a second reasoning as to why and wherefore is no trick at all. Salesmen, special pleaders, subject specialists, and reformers all have pretty packages to peddle, some well worth examining. Wise shopping, nevertheless, probably follows some appraisal of needs.

. . . . The schools have a common obligation: to give all the children of all people a good education. This premise may be presumed to be axiomatic; it is especially understood and reasonably well agreed upon in American education. Communities, whether stingily or generously, tax themselves with some sense of this obligation.

However, a fundamental problem resides in this circumstance, the schools have a common obligation but lack a common intent. This statement should not lead to impetuous conclusions. It does not argue for centralization of authority, more plans for articulation, or national curricula. The common intent that is lacking in the American school is intent to carry out its obligation. (Clary, 1969, pp. 14-15)

There is, of course, much evidence to support his contention. However, there is also reason to believe that much of what appears to be lack of intent to carry out educational obligations is in fact a *very definite intent* to carry out obligations as perceived through ill-conceived or misconceived purposes.

In either case, whether it be ill-conceived purpose or lack of purpose, the result is the same: unmet obligations and a resistance to change.

Inherent in the problem of educational change is the fact that education in its entirety is conceptual. That is to say that the developmental progression of education from the origination of purposes to the nature of the physical act of teaching stems from the mind of man. Education in the school doesn't just

happen; it is created; and it can be no more effective in practice than the clarity, validity, and reliability of the totality of its conceptualization in one's mind will permit it to be.

The sole and obvious intent of including a statement of purposes in this book is to further the likelihood that those purposes will be properly conceptualized by the reader, translated into educational practices, and, indeed, implemented. This chapter, therefore, deals not only with the purposes of education in transition from childhood to adolescence and the role of industrial arts in satisfying those purposes, but perforce deals also with the matter of conceptualizing the nature of education itself, the meaning of purpose, and the character of resistance to change.

### INERTIAL GUIDANCE IN EDUCATION

An inertial guidance system, in essence, is comprised of self-contained, automatic control devices responding to inertial forces in such a way that uniform motion and direction are maintained unless acted upon by some outside force.

Such a system is operant in every educational program. Recognizing its existence and understanding its nature is essential to maintaining a successfully functioning program.

Once developed and set in motion, educational programs are guided by self-contained mechanisms which automatically resist change. The structure and organization of the curriculum tends to remain the same; a particular course may be added or dropped from the curriculum, but for the most part, the nature of each course and the curriculum as a whole stays relatively constant; the content of the courses, teaching methods, and the students' learning experiences tend to continue unchanged; the role assigned to or assumed by any given subject matter area tends to become fixed.

Such guidance, of course, is indispensable. Without it educational programs would be at the mercy of every educational whim. They would flounder aimlessly with no sense of direction, performing their functions, if at all, more by accident than intent. This inertial guidance automatically provides the internal control necessary for stability and continuity of educational practice.

However, if monitoring and evaluating the educational program in reference to the original or modified purposes discovers a need for change, the inertial-guidance, or resistance to change, must be overridden sufficiently to permit the changes to be made. Oftentime, however, the resistance to change is so great that changes cannot occur.

The heart of inertial guidance, the resistance to change, in an educational program (or school system or course) is a phenomenon which may be called an *operational concept*. As used here, an operational concept may be defined as the sum of one or more persons' beliefs concerning a given particular in education which results in a predisposition toward a given manifestation in practice.

Simply stated, in relation to an individual, this means that when a person has finally reduced his beliefs to practical terms, and made up his mind as to how a given thing must be in practice, he has developed an operational concept. Once the concept is put into practice, there is a tendency for less conscious thought to be given to the reasons for the practice each time it is employed. When the practice becomes more or less automatic and consistent without conscious thought by the educator, the operational concept has become fixated. Inertial guidance has taken over and resistance to change has set in. The greater the intensity of the fixation, the greater the resistance to change.

In relation to an educational program, where, of course, more than one person is involved, the resistance to change is the resultant of the inertial forces emanating from the combined fixated operational concepts held by the people involved.

Every aspect of education, from the organization and administration of an entire school system down the organizational ladder to the minute-by-minute decisions of the teacher, appears to be affected, if not entirely controlled, by these well-established, internalized conceptualizations.

A brief discussion of the nature of operational concepts is necessary to clarify their role in the process of automatically resisting change, and more importantly to bring to light the imperativeness of their being founded fundamentally upon sound educational purposes.

It must be noted first that the "sum of one's beliefs" includes beliefs related to many diverse human concerns. For

example, one's conception of proper educational practices may, most assuredly, be influenced by what one believes his peers and superiors expect of him, what one conceives his own ability to be in given situations, and one's beliefs concerning the need to put forth effort. Beliefs resulting from study of philosophical and theoretical ideas, of course, become an important part of the "sum of beliefs." Beliefs stemming from consideration of practical matters such as class size, adequacy of space, equipment, and supplies also have their impact. The interaction of all such beliefs in one's mind in relation to a given particular results in an operational concept relating to that particular.

Of concern is the fact that one or more specific beliefs held by a person may dominate all others in controlling the development of an operational concept. If the educational practices emanating from operational concepts are expected to fulfill the purposes of education, it is vitally important that the dominant element in the development of the operational concepts be those beliefs relating to the educational purposes. Two factors relating to the influence of operational concepts are *clarity* and *intensity*. Clarity refers to how well delineated, precise, and clear an operational concept is in the mind of a person or group. Intensity refers to the degree to which the concept is imbued in the mind of a person or group. Taking note that an operational concept exists only as it is manifested in practice (otherwise it is not operational, but theoretical), it seems likely that the greater the *clarity*, the more internally consistent the practice; and the greater the *intensity*, the greater the probability that the practice will be repeated, thus, in time, becoming fixated. The necessity for having educational purposes well delineated, clearly understood, and firmly in mind during the developmental stages of educational practice is obvious.

The "predisposition toward a given manifestation practice" can be observed in its simplest form in the multitude of day-to-day practices of teachers. For example, when a seventh-grade student asks his industrial arts teacher, "Is this board sanded good enough?" the teacher's response usually is virtually automatic. He does not pause for philosophic thought on what constitutes "sanded good enough," nor does he even mentally check through his objectives for the course. He examines the board in his own particular manner and responds in terms of his *opera-*

*tional concept* of "sanded good enough." Similar situations abound in all areas of industrial arts and all other subject areas. A student in a metals class may spend hours "chasing a thread" in a lathe because his instructor's operational concept of the experience is derived from beliefs which dictate that developing the ability to cut a thread to certain tolerance in a lathe is important. Another instructor may have his students simply start the thread in a lathe and finish it with a die because his operational concept of the experience is derived from beliefs dictating that understanding the operation is sufficient. Because of different operational concepts, one mathematics teacher may be predisposed to insist upon correct answers while another may be predisposed to pay less attention to computational errors if the correct process is employed.

This same reasoning also explains why teachers of the same subject use different teaching methods, organize their classes differently, assign grades on a different basis, and so forth.

At a higher level, more generalized operational concepts are derived from the sum of the beliefs of more than one person. Using the structure of an industrial arts program as an example, it is an operational concept which dictates that a program be organized into courses in woodworking, metalworking, drafting, power mechanics, electricity-electronics, and graphic arts rather than some other course structure.

The difference between an operational concept at this level and one held by an individual is that the combined sums of individual beliefs of the principal, superintendent, school board, industrial arts teachers, and others must be in sufficient accord in clarity and intensity if a given operation is to prevail.

As was stated earlier, the resistance to change that comes from fixated operational concepts is essential to effective teaching, curriculum continuity and stability, administrative action, and other facets of education. A teacher must be able to interact with students in a learning situation without consciously reviewing the total of his beliefs prior to every action; the curriculum must be decided upon in terms of its content and organization, and implemented in a practical manner; administrators must be able to function in day-to-day situations without constant self-debate and reference to the totality of "purpose" before they take action.

Again, when the process of monitoring and evaluating educational practices indicates a need for change, the resistance to change must be overridden. Obviously, the key to overriding the inertial guidance is to change the beliefs upon which the operational concepts are based, which, in effect, means developing new and different operational concepts.

Operational concepts function at the sub-conscious level, but making oneself aware of what transpires in educational practice and evaluating the effects of educational practices can occur only at the conscious level of mental activity. Thus overriding resistance to change can occur only when the professional conscience of a person or group stimulates deliberate, thoughtful, and concerted effort in the re-examination of beliefs.

### THE NATURE OF EDUCATION

Basic to re-examining one's beliefs about education is the matter of clarifying one's concept of education itself; for what one conceives education to be has a profound influence on whether educational purposes are conceptualized and implemented, or the concept is reduced to operational terms on some other basis.

The concern here is not with the *term* education, but with education as a *concept*. The usage of the term, however, clearly illustrates that education is conceived variously as both a product and a process. Reference is often made to education as something one acquires, a passive something which one "gets" by going to school, or something, one "has." In other words, a result, outcome, or *product*. On the other hand, it also is referred to as something that transpires or takes place, an occurrence or event in which one is involved, or something one experiences. So conceived, education takes on the characteristics of a *process*.

On the surface, there appears to be no conflict between the two concepts, for it seems obvious that the *product* known as education is simply something acquired as a result of a person's having been involved in the *process* called education. However, the very fact that both concepts exist means that either or both of them may influence educational practice. The extent to which either concept has an influence may well depend upon how clearly each one is conceived as a separate entity and which one an educator chooses or permits to influence his educational practices. Furthermore, if one cannot clearly separate the two

conceptually, how can one be certain which concept of education is exerting an influence on his educational behavior?

The implications in these two concepts regarding the nature of education illustrate their dichotomous nature and the importance of clarifying in one's mind what is meant by education.

### **Constructional vs. Experimental.**

The concept of education as a product implies that it is a thing which lends itself to being constructed, manufactured, or shaped in some way to given dimensions, proportions, or specifications. The idea that one may "go to school to get an education" reduces education to a fixed, unchanging manifestation of having gone to school. So conceived, education becomes something acquired, a "package of learning" designed and built according to specifications dictated by the function it is to serve. So conceived, it becomes a finite "thing" designed for and attached to the child, but never really becoming a part of the child.

The very term *process* implies a dynamic phenomenon wherein something is undergoing change as a result of being part of or involved in the interaction within the phenomenon. If that "something" is a child, education conceived as a process causes change to happen to the child. Whatever the results of such involvement may be, they become a part of the person, not simply attached to the person. So conceived, therefore, education becomes the phenomenon whereby personal change may take place. It fosters the development of the person. Rather than being acquired, it is *experienced*.

### **Terminative vs. Continuative.**

Another dichotomy implicit in these two concepts is that education as a product is terminal while the process is continuative in nature. To think of education as some sort of "package of learning" that one acquires implies that sometime in one's life, the package will be complete, and the person will acquire no more. The continuative nature of education conceived as a process connotes an ever-present influence, requiring only the involvement of the person to effect continued development. Such a concept denies the existence of a packaged product called "an education," proposing instead that changes in the individual through involvement in the process are additive and without end.

**Formal vs. Non-Formal.**

The notion that education is a product of the schools, or the result of having gone to school, implies that education does not exist in society at large—except for the package of learning students presumably take with them when they leave school. However, while recognizing that the process called education may be employed in a formal setting to achieve certain goals, the always-present nature of education as a process implies that this process also exists in the non-formal, “out-of-school” society at large.

In summary, it may be said that education conceived as a product is a package of learning, designed according to varied specifications for manufacture and assembly in a school, which learners may acquire from the school and take with them when they leave. On the other hand, education as a process is the phenomenon whereby a person, as a part of the phenomenon, experiences learning. The process may occur anywhere at any time without predetermined specifications concerning intended results. However, in the school setting, the process is intentionally activated to achieve prescribed results.

The differentiating characteristic between these two concepts when translated into educational practice lies not in the existence of a package of learning, but in the basis upon which the package exists in the school.

Under the product concept, educational purposes, if considered at all, are assumed to be indigenous to a given program of course activity from which emanates a package of learning. Thus, one need not go through the mental torture of conceptualizing and clarifying purposes and translating them into educational experiences, for to develop a college preparatory program or an industrial arts program, for example, one needs only to install the proper courses—for the former, the installation of as much English, math, science, and foreign language as possible is the common approach for producing the desired package of learning; for the latter, one needs only to install courses, in varying numbers, in woodworking, metalworking, mechanical drawing, power mechanics, graphic arts, and electricity-electronics, or general shop courses which include these subjects.

The influence of the product concept also extends to the nature of the courses and teaching itself. Once the decision is

made that a given course will be taught (i.e., U.S. history, biology, mechanical drawing), the nature of the course under this product concept becomes a function, not of educational purposes, but of the stereotype conception of the package. A course in mechanical drawing, for example, is presumed to deal with lines, lettering, instruments, orthographic projection, perspectives, and other related content. Under the product concept, one would tend to develop and teach the course on the basis of "What should be included in a course in mechanical drawing?" rather than "What are the educational reasons for including this course in the curriculum?"

To the person who consciously or subconsciously conceives of education as a product, the various programs, courses, and activities which make up the curriculum symbolize systems of production which generate the packages of which education is constructed.

Any structuring of curriculum will result in a package of some description, and education conceived as a process may result in a package of learning. Education as a process has no indigenous, pre-ordained, educational purposes, curriculum structure, or specified learnings. It is neutral in that it will serve any educational purpose. It served the educational purposes of Nazi Germany and ancient Greece as well as those of Communist China and democratic America today. To the person who conceives of education as a process, educational purposes translated into educational experiences become the stuff of which the curriculum is developed into whatever form it may finally take.

The usual definitions of education refer to it as a process, but define it in terms of outcomes. Such statements do nothing to characterize the nature of the process itself, or to establish a framework as a basis for conceptualizing the process. However, because of the relationship of curriculum to the process, it is not surprising that the essentials of such a framework should be found in a philosophy of curriculum.

In his book, *Philosophical Foundations of the Curriculum*, Venable outlines a way of thinking about curriculum that requires but little modification to establish the framework of education as a process.

Viewing the curriculum as the core unit of the educational process and basic to all education, Venable listed the *learner*, *subject matter*, the *learning process*, and the *teaching agency* as

fundamental necessities for the existence of a curriculum. He stated that "these four—these four and no more—ingredients make up the curriculum." (1967, p. 22)

He describes these "fundamental necessities" as follows:

First there must be a *learner*—someone to build into his own being whatever is available to learn . . .

Next, there must be *subject matter*, that is the thing to be learned. In its broadest definition, it includes not only the knowledge of fact, but the skills, understandings, attitudes, and appreciations that the learner gains . . . . If there is nothing to learn, no learning can take place.

Then there is the *learning process* itself, the way in which the subject matter is taken in by and becomes a part of the learner. This is a complicated process and, at best, is only partially understood by the psychologists and philosophers.

And finally, there is the *teaching agency*, a subtle but necessary part of the whole learning procedure. Such an agency may fittingly be called the catalyst of the learning situation. The teacher is no more than a teaching agent, but even when there is no teacher present, there is an agency that guides, directs, and organizes the learning experience. The child who discovers a wild flower while alone in the woods and thereby learns does so because somewhere, someone, or something, has directed and organized his thinking so that the learning could be achieved. (1967, p. 21)

Later in his book, Venable describes the teaching agency more fully, expanding the meaning of the term:

Viewed in the broadest possible terms, the teaching agency includes virtually all aspects of the environment in which learning occurs. We may use the term *learning environment* to signify this vast panorama of objects and events that compose the learner's world. (1967, p. 88)

So viewed, the learning environment includes the knowledge, attitudes, skills, and appreciation the learner possesses, as well as all things in the physical world around him at the point of learning.

That these four things are "fundamental necessities" for the existence of a curriculum can hardly be doubted. Without them there would be no *need* for a curriculum nor could a curriculum be developed. The curriculum, however, even in its broadest interpretation, is a part of the *learning environment*. In the school setting, at least, the curriculum is devised by man to create a particular kind of learning environment.

*What Venable has, in fact, described are the elements of the process called education, and the control agent in that process.* One more step must be taken, however, to define the process it-

self. The four elements indigenous to the process do not actually constitute the process. They are, in essence, reagents which must interact if the process is to function. The interaction itself constitutes the process. Thus, education as a process may be defined as *the interaction of a learner, through the learning process, with learning matter in a learning environment.*

This interaction creates an experience which leads to learning. It should not, however, be confused with "learning" or the "learning process." Learning is either the act of acquiring something from the interaction, or the fact of something having been acquired. In either case, learning is the *result* or *product* of the interaction and occurs through the learning process (the way in which subject matter is taken in by and becomes a part of the learner), which is an integral part of the learner. The process of education—that is, the interaction of the elements—occurs externally to the learner until the learning process causes something to be learned.

Acceptance of this deceptively simplified way of thinking about education leads to at least three important conclusions:

1. Most obvious, perhaps, is that the introduction into a social order of a formal structure called a "school" is an attempt to control the interaction of the elements in the educational process, thereby directing it toward desired ends.
2. The process is activated and controlled by introducing the curriculum.
3. To satisfy given educational purposes, the curriculum must emanate from those purposes.

## THE NATURE AND FUNCTION OF EDUCATIONAL PURPOSES

Every educational program and every educational practice evolves from some conception of purposes. The purposes may exist in the subconscious mind, somewhat shapeless and unidentifiable, perhaps sublimated and even supplanted by a quagmire of fixations on educational practice; or they may be clearly formulated and sharply outlined in one's mind as entities separate and apart from educational practice itself. It is axiomatic that one can implement an idea only in terms of the nature of one's conception of it. Thus, what an educational program is or becomes depends fundamentally upon what the persons involved

conceive the purposes to be, how clearly and precisely the purposes are conceptualized, and the thought and action taken to convert those purposes into educational experiences.

It is imperative, therefore, that consideration be given to the meaning of the term "educational purposes," for one's conception of what is meant by educational purposes sets the stage for conceptualizing the actual purposes the educational process will be expected to serve.

*Educational purposes are mental, not physical, phenomena.* They may be thought of as those concepts of desirable mental, physical, social, political, and spiritual conditions of human existence whose creation or perpetuation are intended through the process of education.

Two important considerations emerge from this definition. First, as concepts, educational purposes originate and remain in the human mind. They are mental conceptualizations of human values education is intended to foster. Such concepts may be expressed in written or oral form, resulting in *statements of purposes*. Such statements must be recognized for what they are, simply expressions of purposes. For these expressions to be transformed into purposes, they must be re-conceptualized in the human mind as values, rather than words, and perceived as values which education should foster. Second, one's concept of a desirable condition of human existence is not an educational purpose unless there is a corresponding intent to create or perpetuate the condition encompassed in its formation.

*Educational purposes dwell only in the mind of an individual person.* Each person conceives educational purposes for himself, and only when the concepts of purposes held by the individual members of a group are in close harmony can it be said that the purposes are group purposes. The implications in this characteristic are obvious. If a school, or a given program in a school, is to serve a specific set of educational purposes, the educational personnel in that school or program must share a mutual conception of purposes. To the extent that the individual concepts are divergent, the intended guiding concepts will not be served. Contrarily, an attempt will be made to serve the divergent concepts if they are indeed purposes.

*Educational purposes are a program's reason for being, not the expected results of its being.* The fact that "purpose" and

“objective” are often used synonymously makes little difference in normal conversation. However, it can make a serious difference in what one conceives educational purposes to be. This is especially true when giving thought to the purposes of programs already in existence.

The word “purpose” implies a settled, mental determination of mission or reason for a thing’s being. A purpose precedes a thing’s being and provides the basis for its existence. The word “objective” implies something more specific, tangible, and immediately attainable, something resulting from action. Objectives may be thought of as being specific goals which must be achieved if the educational purposes are to be served.

In normal usage, the term “objective” refers to the goals of a program already in existence. In industrial arts, for example, certain objectives emanate from mechanical drawing, while others result from woodworking. There is a tendency to think in terms of what the existing course or program is supposed to do, thereby causing objectives to take on the character of functions. The validity of whatever exists is assumed, the only question being what should it do. Educational practices are thus self-perpetuating, for one simply identifies the kinds of learning which can accrue from the course or program and strives to achieve them. One should not be surprised upon evaluation to find that the learning did occur.

Thinking in terms of educational purposes, one forgets the existence of programs and courses for the moment and conceptualizes desirable conditions of human existence. Once this is done, specific learnings which will create those conditions are identified, and only then does one devise ways of achieving the proposed learnings. With such an approach, one may discover that courses in mechanical drawing, woodworking, Latin, or English are not really needed, at least not in their present form.

*Educational purposes serve three basic functions.* First and foremost, they provide the prime rationale for program development; second, they serve as guidelines for teaching; and finally, they become the fundamental standards for evaluation.

In essence, then, educational purposes are *the authoritative criteria* from which educational objectives and subsequent learning experience evolve; to which an educator may refer for

guidance in making educational decisions; and against which educational progress may be compared.

It goes without saying that causing educational purposes to perform these functions requires a prior knowledge and understanding of the purposes themselves; and for the purposes to truly become the authoritative criteria upon which the program is based, they must consciously be used as such. The knowledge and understanding of the purposes, as well as the decision to use them, must be at the *conscious* level of concern. This means that one must deliberately give thought to the matter of identifying "reasons for being" and comprehending them—one must do so, that is, if one expects educational practice to satisfy one's particular purposes.

### DERIVATION OF PURPOSES

The fundamental purpose of education in any social order is the preservation and improvement of the way of life in that social order. Every society attempts to transmit from one generation to the next the knowledges, skills, attitudes, spiritual and moral values, and other aspects of the existing culture believed to be necessary to the maintenance of the cultural heritage and betterment of the way of life. From this fundamental purpose are derived the educational purposes upon which the curriculum in the schools is based.

Deriving educational purposes, therefore, necessitates the conceptualization of a desirable way of life in terms of desirable conditions of human existence whose perpetuation or creation are intended through the educational process. Decisions must be made concerning what is *worth* preserving, because not all knowledges, skills, attitudes, and values are essential to or even congruous with a given way of life. Further decisions are required concerning priorities, because not all of the infinite number of details of the cultural heritage worthy of perpetuation can be perpetuated through the schools.

The nature of the educational purposes in a given social order will depend upon the nature of the social order itself and what it deems worthy and important. The concern here is with the American way of life and its purposes for education in the transition years of youth.

Perhaps the most distinguishing characteristic of the American way of life is its democratic nature. But within that characteristic, the recognition of the *unique worth of the individual* as an entity separate and apart from the society of which he is a part is the fundamental concept upon which the American way of life is based. Thus, educational purposes for the transition years of youth in America must reflect not only the knowledge, skills, attitudes, and values important to society at large, but equally, if not especially, those important to the individual.

The very essence of the American way of life requires that each individual assume responsibilities relating to personal development and the development of all persons. The American way of life depends upon the intelligence, conscience, competencies, and effective critical thinking of the individual, and requires that each individual develop the knowledge, skill, attitudes, and values essential to living in the contemporary way of life (Wilber, 1967, p. 11)

The characterization of the American way of life as being democratic brings forth only one of the main features indigenous to its nature. The contemporary way of life in America may also be characterized as *industrial* in nature. Every facet of the American way of life is influenced by the production capabilities of American industry. Not only is the *standard* of living affected, but also the *way* of living. The purposes of American education today must take into account the fact that today's youth will be living, working, playing, and participating as citizens in a way of life wherein the nature of those activities are directly influenced, if not often virtually controlled, by the industrialized nature of the way of life.

The prominence of technology in the American culture has caused the way of life also to take on a technical orientation. More than simply the application of science, technology has to do with man's ways of doing things, not only in industry itself, but in society at large, utilizing the products and services of industry.

The perpetuation and improvement of the industry and technology in the American way of life requires, among other things, support of the citizenry which stems from knowledge of the fundamental principles and nature of industry and technology and the resultant impact upon the American way of life. Additionally, the perpetuation and improvement of industry and tech-

nology requires a citizenry with the knowledge, skill, attitudes, and values sufficient not just to produce goods and services, but to incorporate them wisely into the way of life. This is not a reference to producer-consumer education, *per se*, but to the fact that man must be the master of, not a slave to, industry and technology in his culture.

The unique worth of the individual requires that the purposes of education in America relate also to the development of the knowledge, skill, attitudes, and values which will permit and encourage each person to develop, participate, and prosper *as an individual* in America's technologically-oriented, industrialized, and democratic way of life.

Education during the transition of youth from childhood to early adolescence is but one phase of the continuing physical, emotional, social, and intellectual development of the individual. It is a part of the educational experience that grows out of the earlier experiences of childhood, transcends a crucial period in the maturation of youth, and leads into continued educational experiences at a more sophisticated level of participation.

The educational purposes for these transition years are based upon the purposes for the whole continuum of education, but derive their specific intent from the uniqueness of the child's development during these years and the particular conditions of human existence desired for the child in passing through and exiting this phase of life and education.

The psychological revolution within the child during the transition from childhood to adolescence is discussed in detail in Chapter II. Of particular concern here are those characteristics of youth during this transition to which educational purposes must be addressed.

The maturational transition from childhood to adolescence is normally from three to five years in duration and usually occurs between the ages of ten and fifteen. This period in their life is characterized as one wherein (1) general awkwardness occurs due to rapid change in body dimensions; (2) the development of new social skills are required because of an awakening interest in and interaction with persons of the opposite sex; (3) the activities of the peer group change dramatically; (4) tremendous change in the individual's perception of himself occurs, with a corresponding quest for a satisfying self-concept; and (5) the

student progresses from a dependence upon what he perceived in the immediate environment to a level of intellectual activity dealing with hypotheses and abstractions. (Alexander, 1968)

The transition period in life is often described as being "traumatic" for the child, and anyone who has worked closely with youth at this stage of their development has little reason to doubt the description. Emotions, always turbulent, often change in extremes. From sadness to gaiety, affection to anger, belligerence to cooperativeness, timidity to gregariousness—the emotions change directions, sometimes one way, sometimes another, and very often with explosive suddenness.

Such conditions of human existence obviously must be taken into account in any conceptualization of purposes for education during the transitional period. The emotional well-being of the child is of imperative concern in and of itself. But important, too, is recognition of the fact that minimizing the emotional impact is a necessary requisite to satisfying other educational purposes.

Aside from psychological concerns, other implications for educational purposes emerge from the characteristics of youth during the transitional period. Of particular importance is the fact that the child is gripped by an intense curiosity about himself and his relationship to the world around him at the same time his intellectual powers are expanding. As a result, the child comes to the realization that he is in the midst of a great, wide world about which he knows very little. Trying to identify himself in a world suddenly open to him, the child struggles to form a new concept of himself, not only socially and sexually, but also physically and intellectually. Masculinity and femininity, of course, take on new meanings as boys and girls strive toward their changing images of adult status for themselves. However, able now to think at a higher, more abstract level, the child also delves into a wider range of concerns. This new-found curiosity and intellect leads to a fascination with the physical world, and to how and why things work and are done the way they are. Few institutions in the culture escape scrutiny as occupations, economics, politics, and other areas of concern become increasingly important to the youngster. Finding himself on the fringes of adulthood, the child needs and strives for achievements which will help him feel "grown up."

The significance of the parallel increase in curiosity and level of intellectual performance is widely recognized among educators in deriving educational purposes. Commenting on the nature of children and their newly discovered world, Grooms describes them as "vigorous, inquisitive individuals . . . assiduously requiring proper occasions for explorations and venture . . . often in need of opportunities for trial and error in situations where mistakes are admittable." (1967, p. 5)

Sinks probably speaks for many, if not most, authorities on education during the transition years when he concludes that the prime purpose should be the development of "autonomy of learning in each individual student." Specifically, he suggests that each student should acquire "knowledge of methods of learning, skill in inquiry, competence in problem solving, and a keen and persistent motivation to pursue knowledge." (1969, p. 6)

In contrast, but not in conflict with Sinks' statement, DeVita contends that students during the transition period should "achieve the highest degree of responsibility, productivity, creativity, and self-respect in settings which will allow them to experience the fabric of life." (1970, p. 67)

Citing the need to cultivate the uniqueness of the individual and to meet the individual's personal and social needs, VanTil (1961) also emphasizes that education during the transition years should help the student (1) come to grips with pressing social realities, (2) understand and practice democratic values, (3) further develop the basic skills required for intelligent citizenship, (4) acquire a basic understanding of the natural world and modern scientific technology, and (5) discover and develop creative talents.

Ascertaining the educational purposes upon which the educational program will be built must be accomplished in each school. No one can *tell* a local faculty what the purposes are to be, for not only is each community unique in terms of educational needs; but, as was stated earlier, true educational purposes exist only to the extent that the persons involved in teaching and curriculum development hold mutually compatible concepts of the conditions of human existence the school should foster.

Suggesting that each school should develop its own statement of purposes for the transition years of youth, Alexander offered guidelines which incorporate and, in essence, summarize the

entire foregoing discussion. He proposed that education for the transition years should:

1. *help the pupil understand himself as a unique human individual with personal needs and shared social responsibilities . . . .*
2. *assure every pupil a degree of success in understanding the underlying principles and the ways of knowing in the areas of organized learning . . . .*
3. *promote maximum individual growth in the basic learning skills . . . .*
4. *foster independent learning on the part of every pupil . . . .*
5. *permit wide exploration of personal interests . . . .* (1968, pp. 84-86)

### THE ROLE OF INDUSTRIAL ARTS

Educational theory in any field is always years ahead of practice. So it has been in industrial arts, partly because of the role industrial arts itself assumed, and partly because of the role thrust upon the field by curriculum designers.

Beginning in the early 1950's, however, the gap between theory and practice began to narrow—very slowly at first, but later with increasing swiftness. This was due, in part, to the recognition by educators during the *post*-Sputnik era that industrial arts was closer to industry and technology than any other part of the general curriculum, and could, with modification, immediately assume a space-age orientation. (Barlow, 1967)

VanTil recognized the changes taking place in industrial arts and expressed the sentiments of many junior high school curriculum specialists:

The industrial arts program of the modern junior high school is a far cry from the shop of the early junior high school. Its primary purpose as well as its program has shifted . . . .

Civilized man has always been distinguished by his tools and his techniques of using them . . . . Technology is central in our culture. An effective general education today certainly requires that we develop in all boys and girls basic technological literacy. Proper orientation to and understanding of our industrial civilization is a legitimate function of the school. While science and social studies and core courses make a major contribution to this function, industrial arts is specifically directed toward this goal. (1961, p. 344)

Another important factor in narrowing the gap, however, is the professional activity in industrial arts which began during the *pre*-Sputnik era and continues yet today.

Industrial arts was no different from other areas of education in its new attempts to evaluate and define its purposes, determine its direction, and adjust its course in the most effective manner. But industrial arts checked upon itself continuously with a persistence and determination that may have been unusual . . . . It was a case of adjustment by adding new concepts without losing the proven values of the old; and it was a case of interpretation and reinterpretation of principles, purposes, objectives, and goals. In a sense, it was a problem of professional in-service training concerning fundamental elements. (Barlow, 1967, p. 280)

The "fundamental elements" with which industrial arts was (and is) concerned centered around the proposition that the role of industrial arts should be to reflect the industrial and technological aspects of the American culture into the curriculum for the benefit of all youth.

The proposition itself was not new; indeed, the proposed role had been the conceptual basis for industrial arts since its inception around the turn of the century. However the proliferation of objectives and varying interpretations of their meanings within the profession helped to negate implementation of the role. Concepts of purpose related to manual training and manual arts programs of a by-gone era also had the effect of perpetuating experiences drawn from skilled trades. These concepts tended to emphasize manipulative skills and "practical" shopwork rather than industry as a whole. Reliance on old concepts was due in part to the lack of an acceptable conceptual framework of industry from which new concepts of purpose and experiences could be drawn.

The period of interpretation and reinterpretation resulted in identifying several acceptable conceptual frameworks of industry, which are discussed elsewhere in this book. A determined search for clarification and unity of purposes resulted in broad basic concepts of purposes now widely accepted in the field. Interpreted and translated into educational experiences, within the concept of industrial arts as a study of industry and its associated technology, the accepted basic concepts of purpose provide the foundation for the role of industrial arts in American education.

Although they have been expressed in many ways, the basic concepts of purposes for industrial arts may best be summarized in the form of broadly stated goals. *A Guide to Improving Instruction in Industrial Arts*, developed by the Industrial Arts

Division of the American Vocational Association, suggests the following as unique responsibilities of industrial arts:

- GOAL I — Develop an insight and understanding of industry and its place in our culture
- GOAL II — Discover and develop talents, aptitudes, interests, and potentialities of individuals for the technical pursuits and applied sciences
- GOAL III — Develop an understanding of industrial processes and the practical application of scientific principles
- GOAL IV — Develop basic skills in the proper use of common industrial tools, machines, and processes
- GOAL V — Develop problem-solving and creative abilities involving the materials, processes, and products of industry (1968, pp. 9-11)

Although these goals are those for which industrial arts is uniquely responsible, they must be considered in the light of the overall goals of the school. Superimposing the goals of industrial arts upon the goals of the school, which were suggested earlier, will provide a basis for conceptualizing the specific purposes and role of industrial arts in the transition years. Although separated here for illustrative purposes, both the goals of the school and of industrial arts are interrelated and mutually reinforcing.

*SCHOOL GOAL I—To help the pupil understand himself as a unique human individual with personal needs and shared social responsibilities. (Alexander, 1969, p. 34)*

Relating to both personal and educational guidance, this goal implies that the purposes and resulting experiences for industrial arts must be conceptualized and implemented in terms of the individual student. More specifically, the role of industrial arts should be that of developing a mature self-concept in relation to industry and technology and the society which it permeates.

*SCHOOL GOAL II—To assure every pupil a degree of success in understanding the underlying principles and the ways of knowing in the areas of organized learning. (Alexander, 1969, p. 84)*

This implies that purposes and resulting experiences for industrial arts should be conceptualized and implemented in such a way that each child, commensurate with his mental maturity, will understand the fundamental principles upon which industry and technology is based (i.e., principles relating to organization, production, transportation, communication, financing, etc.).

The significance of the increased level of intellectual functioning should not be missed in designing educational experiences. Also implied is an integrating role involving the interrelationships of knowledge between other areas (i.e., math, science, social studies) and the study of industry. Helping students understand how knowledge is produced in industry is an obvious role, and suggests a concern for developing problem-solving abilities, study of research and development in industry, fostering creativity, and extending the natural curiosity of youth into the unknown.

SCHOOL GOAL III—*To promote maximum individual growth in the basic learning skills.* (Alexander, 1969, p. 85)

This goal deals with basic skills in communication and computation, social and civic competence, and continued learning. Understanding the meaning of technical terms, and the ability to use them properly, is implied, as well as the development of basic skills in communicating verbally and graphically in dealing with technological subjects. Evident, too, is need for concern in fostering computational abilities in an industrial and technological context. Implicit in industrial arts' role also is the development of basic competencies in inter-personal relations required in the industrial world of work. That each student has a broad knowledge base concerning industry and the desire and competencies required to continue learning, both formally and informally, in industrial and technical matters are important considerations for industrial arts.

SCHOOL GOAL IV—*To foster independent learning on the part of every student.* (Alexander, 1969, p. 6)

Helping the student to discover and develop problem-solving and creative abilities, talents, aptitudes, interests, and various skills in relation to technical pursuits and industrial materials and processes is an obvious part of industrial arts' role in satisfying this goal. Discovering and developing these attributes *demand*s independent learning.

The primary implication here is that the student must learn how to learn, how to plan and organize, and how to approach a technically-oriented learning situation, then be given the freedom and guidance to learn on his own.

SCHOOL GOAL V—*To permit wide exploration of personal interests.* (Alexander, 1969, p. 86)

This goal deals with both method and function. Exploration as a function implies a responsibility for industrial arts to satisfy the *personal interests* students may have in industrial arts. As a method, exploration becomes one means whereby the major goals of industrial arts can be satisfied, but implies a responsibility to provide a wide range of individualized learning experiences in using this method. Further implied is the responsibility to conceptualize purposes and experiences which relate to all of the major goals.

### A WORD OF CAUTION

At the beginning of this chapter, the point was made that education can be no more effective than the educators' conceptualization of purpose and experiences will permit it to be. The impact of operational concepts as a force in resisting change was also explained. These two principles are particularly significant to the role of industrial arts during the transition years.

As was explained in the previous section, industrial arts has long been conceptualized in theory as a study of industry, and increasingly in recent years, the concept has become the operational concept for program development.

Historically, however, two basic operational concepts of industrial arts have, perhaps more than any others, created resistance to the full implementation of the potential of industrial arts in satisfying its fundamental role. One is the conceptualization of industrial arts almost exclusively in terms of "practical" values, resulting in "practical arts" programs. This concept undoubtedly has had much to do with fostering the second operational concept, which is that industrial arts is *for boys only*.

Most resistance to change in industrial arts today stems from these fixated operational concepts. A brief examination of their implications should help to dispel the notion that they can serve as a viable base for industrial arts in today's schools.

When industrial arts is conceived in the practical arts context, it is usually conceptualized around one or more of four outdated concepts of purpose: (1) hobby interests, (2) consumer education, (3) home maintenance, and (4) pre-vocational preparation. All of these four notions have one thing in common—

they mistakenly construe concomitant values which may accrue from industrial arts as fundamental purposes. The question is not whether these ideas of human concern are important; the question one must ask in re-examining one's beliefs and conceptualizing educational purposes is whether emphasis upon those concerns during the transition years of youth can foster educational development as effectively as the study of industry and technology.

### **Hobby Interests.**

The idea that industrial arts may foster certain types of hobby interests is undeniably true. But so does every other part of the curriculum, and this is as it should be. Of considerable importance here is recognition of the fact that hobby interests grow out of exposure to stimulating activities regardless of the intent for which an experience was planned.

Fostering "interest in hobbies" is only one part of the area of concern. The more important quality the entire school intends to foster is actually an *attitude* toward the wise use of leisure time. This attitude should encourage not only the development of hobby interests, but interests in using leisure time for such things as service to humanity, civic involvement, and cultural and scholarly pursuits for sheer enjoyment or self-improvement. To conceptualize hobby interests as one of the prime purposes of industrial arts is to deny the students the opportunity to develop these higher-level interests as they relate to industry and technology as a part of the culture.

### **Consumer Education.**

Consumer education, too, is a concern of all education, not just industrial arts. It relates at least as much to the development of attitudes and rational thought as it does to the acquisition of specific knowledge. The ability to calculate and read, to understand the nature of materials, processes, and mechanisms, and to translate scientific principles into practical values is essential to one's being a wise consumer. But these abilities may accrue from study in mathematics, language arts, industrial arts, science, and other areas without consumer education being conceived as a primary basis for the program's existence.

Furthermore, conservation of resources is the larger concern of which consumer knowledge is only a part. Certainly experiences emphasizing industry as an institution in the culture and

the technology which supports it would contribute to the larger concern. The primary purpose in such experiences, however, should be the development of the ability to think rationally from a knowledge base in relation to industrial and technological matters, regardless of the area of human concern with which those matters deal.

### **Home Maintenance.**

This concept often manifests itself in a program emphasizing "home maintenance" activities, and in some cases special courses dealing solely with "how-to-do-it" exercises. When the primary purposes of industrial arts are conceived as fostering problem-solving experiences with implications for direct applicability to modern industry and technology, and to living, working, playing, and growing into adulthood in an industrial-technical society, industrial arts becomes an important part of the education of the child. However, the purposes are sometimes conceived more narrowly as being to provide "how-to-do-it" experiences, such as "how to wire an extension cord," "how to repair a lawnmower engine," "how to repair a faucet," "how to install a window pane," "how to refinish furniture," *ad infinitum*. so conceived, the potential of industrial arts cannot become a viable part of a child's education.

### **Pre-Vocational Preparation.**

When pre-vocational preparation is conceived as one of the major purposes of industrial arts, it tends to supersede all other purposes. The program may, as a result, take the form of rather lethargic "tool instruction" in the areas of woodworking, metalworking, drafting, auto mechanics, and others. It may, however, take the form of a vigorous introductory program to skilled-trade areas offered at the high school level. In the "better" programs, vocational guidance and concern for occupations beyond the scope of the high school program are also included. In either case, the learner's education suffers from the lack of broad experiences implied in the five major goals cited earlier.

The fallacy in the pre-vocational conception of industrial arts is that exploratory skill training, even accompanied by vocational guidance and technical knowledge related to the skills, is applicable in only a very small range of occupations. The sadness in it all is that it confines the child's exploration at a time when the range of exploration should be at its greatest, and

denies the child the opportunity for the broad industrial-technical orientation required for flexibility and adaptability in today's world.

Now all of the discussion above does not mean that industrial arts has no relation to the world of work. Indeed, that is a large measure of what industry is all about—people managing, planning, producing, servicing, transporting—performing all the various jobs required to make the institution function. But that is not the same concept as pre-vocational preparation. If industrial arts satisfies its five basic purposes, youth will exit the transition years with, among other attributes, a background of basic technical knowledge, insight into the nature of industry (including the industrial world of work), and various basic skills (manipulative as well as judgemental and problem solving). In addition, they will have a more mature concept of themselves in relation to their industrial and technical culture. Such attributes obviously contribute to the ability to make wise selections in occupational endeavors, and provide a background of experience and knowledge which would foster success in training for most technically-oriented vocations.

Occupational orientation, hobby interests, knowledge of value to consumers handyman abilities, and other values are anticipated outcomes of a program based upon a study of industry intended to achieve the five broad goals stated earlier. But these concomitant outcomes do *not* comprise the conceptual framework of purpose upon which such a program may be based.

The role of industrial arts during the transition years of youth as proposed herein makes no distinction between the sexes. The concern here is that the industrial and technical nature of the American culture affects, and is affected by, both boys and girls, and men and women. That this is true is so obvious that it needs no further elaboration. The historical operational concept of *boys only*, however, will probably persist as long as industrial arts programs are conceived in the practical arts context.

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# Administrative Patterns in Contemporary Education

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Appropriate educational programs for early adolescents have been emphasized during recent years as educators have become acutely aware of the particular needs and interests of this age group. The primary purpose of this chapter is to examine prevailing organizational patterns in early adolescent education. Particular stress is placed on a comparison of the advantages and disadvantages claimed for the junior high school and middle school systems of organization. Administrative considerations for the intermediate grades are also discussed.

A second concern of the chapter is the implementation of the educational program for early adolescents. Administrative arrangements are of crucial importance in providing for such innovative teaching techniques as team teaching, individualized instruction, and correlated instruction. Flexible or modular scheduling and ungraded schools impose significant demands upon educational administration. Each of these innovations is explored in terms of administrative provisions needed for effective application of the instructional approaches in the schools.

## TYPICAL ORGANIZATIONAL PATTERNS

The evolution of contemporary organizational patterns in our educational system has resulted from the interaction of educational leaders with the leadership of such influential groups as labor and business. Social and technological change have exerted some influence in the development of the present pattern of educational organization. The public high schools evolved their organizational plan following the Civil War and attempted to

serve college preparatory students as well as terminal students (Butts and Cremin, 1958). Numerous educational commissions, aware of the collegiate pressures on the high schools to maintain emphasis on preparation for college, recommended changes in the organizational standards of the elementary and secondary schools.

### **Elementary Schools**

The typical elementary school is organized to serve students in grades kindergarten through six, usually in self-contained classrooms. Each teacher acts as the instructor for all subject areas, with the possible exception of activities in music, art, physical education, home economics, and industrial arts. Special education students and remedial reading courses are usually taught by specialists in those areas.

The self-contained classroom provides the teacher with ample opportunity to become aware of each child's individual problems and needs. The lengthy periods of contact each day permit the teacher to guide the child's development most effectively. However, the self-contained classroom presents some difficult problems in the management of instruction. One of the criticisms of the self-contained classroom is that an individual teacher is rarely versatile enough to be adept in teaching all subject areas equally well. There also exists the possibility of personality conflicts between individual teachers and students from which neither can gain relief.

Some elementary schools are fully or partially departmentalized, especially in grades five and six. In the departmental organization, individual instructors are responsible for specific subject areas. Thus, students study different subjects under the direction of different teachers. This permits teachers to work in the areas of interest to them or where their preparation is best. Students have an opportunity to work with several teachers during each school day. Often these programs are supplemented by a "home room" or directed study period.

Ungraded schools have proven to be quite successful at the elementary school level. Many innovative schools utilize individualized instruction in the elementary grades. Some schools provide for the correlation of the instruction in the upper

elementary grades. These are perhaps the most common instructional innovations common to the elementary schools, though this short list is by no means complete.

### **Junior High Schools**

Concern with the problems of retention, child labor, lack of practical education, and a new awareness of the needs of adolescents helped to support the advent of the junior high school, an educational development of the early 1900's. By 1920, there were 400 junior high schools in the United States. However, 83 per cent of the students were enrolled in schools which maintained the traditional 8-4, elementary-secondary organization. By 1959, school systems still using the 8-4 pattern enrolled only 18 per cent of the students in the United States. Most of the other students were enrolled in a system with a junior high school, though their schools may have been organized in either 6-2-4, 6-3-3, or 6-6 plans (Howard and Stoumbis, 1970).

One of the first junior high schools utilizing the 6-2-4 pattern and a revised curriculum was established in Richmond, Indiana, in 1896. Later, Columbus, Ohio, established the intermediate 6-3-3 grade pattern in 1909. This organizational pattern was the first to use the term "junior high school." (Howard and Stoumbis, 1970) These plans were developed in local attempts to seek solutions to the problems of the 8-4 organizational pattern.

While the junior high schools appeared in response to the search for a better organizational pattern, several factors contributed to their expanded popularity. Business and labor leaders sought more vocational training and increasing numbers of immigrant children needed practical education. Perhaps most important was the impact of John Dewey, who attacked the inefficient use of time in the upper elementary grades and advocated a curriculum concerned with individuals rather than a pre-college program.

The most prevalent junior high school organizational plans presently used serve either grades seven and eight or grades seven, eight, and nine. Within this organizational structure, the educational program is usually departmentalized, with one or more teachers responsible for instruction in each of the subjects. The students must pass a certain number of required courses to advance from one grade level to the next. Students in grade

nine must consider the requirements for senior high school graduation in scheduling their courses. Junior high school students are frequently encouraged to participate in intramural or interschool athletic programs, musical activities and programs, subject-oriented clubs, and student government.

### **The Middle School**

Some educators believed that the intermediate grade students needed a school which would be organized to serve them, rather than copy the senior high school, so the "middle school" was developed. The middle school provided a transition between the self-contained elementary school, which focuses on children's individual needs, and the departmentalized senior high school, which concentrates on subject specialization. The average ages of the middle school students, sometimes called the "tween-agers," range from twelve to fourteen years. The most common organizations are based on the 4-4-4 plan, whose middle school contains grades five through eight, and the 5-3-4 plan, which includes grades six through eight in the middle school. The curriculum is usually flexible, but strives to be neither elementary nor secondary in nature. There is also a conscious effort to implement innovative methods such as team teaching, non-grading, up-to-date educational materials and equipment, interdisciplinary coordination, and independent study in the middle school.

Growth of the middle school pattern of grade organization has been rapid. The Education Research Service survey for the 1963-1964 school year reported only one percent of the school systems following the 5-3-4 plan. In 1966, at least ten percent were planning for or functioning on either the 5-3-4 or the 4-4-4 plan. Among the leading states in the middle school movement at that time were Texas, Washington, Illinois, Michigan, and Wisconsin. A large concentration of middle schools were operating in the eastern states, especially in Massachusetts and Connecticut. New York was leading in the rate of development, perhaps at least partially because of the 1965-1966 movement to eliminate de facto segregation. The segregated neighborhood schools were permitted to remain for the youngest elementary children, but it was expected that the middle school would serve a larger and more racially balanced and integrated area (Brod, 1966).

### **Senior High School**

The traditional high school organization is composed of grades 10-12 or grades 9-12. All grades must be completed in sequence. The curriculum consists of required departmentalized courses and elective subjects. Students must earn the total number of Carnegie units necessary for graduation. Most high schools encourage the early selection of the academic courses which are preparatory for college or general education courses; some use "tracking," an application of homogeneous grouping.

### **FACTORS IN THE SELECTION OF AN ORGANIZATIONAL PATTERN FOR THE EARLY ADOLESCENT**

The junior high school, resulting from secondary school reform, was expected to solve many educational problems. Even though many of the functions of the junior high school fulfilled educational needs, additional problems arose which have yet to be solved.

### **Advantages of the Junior High School**

One of the reasons advanced for the elementary-junior high-senior high organizational pattern was the argument that the subject matter in grades seven and eight was too specialized for the individual elementary teacher to present all of it effectively. It was also predicted that the 6-3-3 organization would keep children from leaving school for employment following the completion of grade eight. Later, the passage of child labor laws and compulsory attendance laws removed most opportunities for leaving school during the junior high school years.

Junior high schools were also organized to relieve the overload in senior high schools in some communities. It was believed that junior high schools could provide better articulation between the elementary schools and the senior high schools by providing experiences with elective courses and departmentalized instruction. The junior high school allows exploration and pre-vocational experiences which assist pupils in their selection of later school courses and in career identification. Individual differences in abilities and interests can be accommodated in the junior high school, which offers improved social opportuni-

ties and a variety of student activity programs. The junior high school can provide a wide range of subjects and comprehensive testing programs. It can also provide for efficient utilization of instructional time in subjects appropriate for the age levels served by eliminating unnecessary duplication which may occur when two schools serve the age range.

A comprehensive study by Gruhn and Douglass (1956) identified six basic functions of the junior high school: (1) integration of knowledges, skills, attitudes, interests, and understandings; (2) exploration to discover interests; (3) guidance to help students in mental, emotional, and social adjustment; (4) differentiation of opportunities for maximum individual development; (5) socialization, assisting the individual in effective social participation; and (6) articulation of the elementary and senior high school educational activities. Other studies have given more emphasis to the contribution of the junior high school in retaining students in school and the efficient use of instructional time. Gruhn and Douglas (1956) tend to emphasize the values of the junior high school in developing the individual and helping him attain an integrated adjustment to himself and to society.

### **Disadvantages of the Junior High School**

The formation of the junior high school in the educational system solved some critical problems; unfortunately, it also generated some new problems. It has been suggested that the junior high school has not been successful in defining the scope and sequence of a satisfactory general education (Alexander, 1964). Instead of undergoing a gradual transition from the elementary grades, the seventh grade student in most junior high schools is immediately started on a rigid, daily, departmentalized seven-period schedule of courses.

Opportunities to develop an individualized educational program are limited, since the high school often dictates policy, especially in the ninth grade program. The ninth grade student is not allowed flexibility in scheduling because of the requirements for high school graduation, which usually include courses completed in grade nine. Instruction is often based on lecture or textbook methods, which tends to stifle the students' natural curiosity as well as to reduce their initiative to explore and

experiment. This stress on academics and the rigidity of departmentalization also restricts the availability of the kinds of exploratory learning activities which are recommended for the early adolescent.

Many junior high schools have indeed become junior versions of high schools and colleges, with heavy emphasis placed upon interscholastic athletics and the early introduction of sophisticated social activities. High school social patterns are often initiated by junior high schools, including an extensive array of extra-curricular activities which encourage dating.

There is general agreement on the need for stability during early adolescence, when children experience significant physical and emotional changes. Instead, in most instances, they must adjust to a different school, new teachers, and a changed school routine. Discipline problems are numerous at this level as the result of social, physical, and academic pressures. Consequently, many experienced teachers desert the junior high schools, usually to teach at the senior high level. The high rate of teacher turnover leaves a high proportion of inexperienced teachers in a situation where children need experienced guidance and individual attention more than at any other age level.

Very few states require specific preparation and certification programs for junior high school teachers, who need specialized training for teaching and counseling early adolescents. Teachers prepared to teach either in the elementary or in senior high schools are typically considered to be "qualified" to teach in the junior high schools.

### **Advantages of the Middle School**

A valid reason for reorganizing the school system is the improvement of the quality of the educational program. "Where the focus is on program improvement, one or more of three closely related reasons for the middle school usually justifies the reorganization: (a) to develop a program of education that has greater continuity; (b) to organize a school program in relation to levels of human development; (c) to utilize the challenge and opportunity of a new school organization to introduce various educational changes." (Frazier, 1968, p. 56)

*Continuity in the Middle School.* The gap between elementary and secondary schools can be reduced by joint planning of

educators for a middle school pattern. Such planning can bring about better articulation and continuity of the educational program with emphasis upon the enrichment of basic fundamentals.

The middle school also provides a gradual change from the self-contained classroom to the complete departmentalization which they will encounter in the high school. Howard indicates that “. . . the intermediate school provides a more gentle shift to departmentalization; guidance functions are available, and more attention is given to individual differences.” (1959, p. 406)

When the ninth grade is included with the senior high school under the middle school plan, better coordination of high school courses is possible. Administration and scheduling are more effective, and special programs to be used for the ninth grade are available for use by older students. Less complex facilities and equipment may be selected to serve all grade levels in the middle school. Howard and Stoumbis (1970) also reported a reduction in the number of discipline problems when the ninth grade was moved into the senior high; similarly, discipline in the elementary school improved when eleven-year-olds were placed in the middle school.

Curriculum planning in the middle school is free from college and high school requirements, since college applications require only the transcript of credits from grades nine through twelve. The freedom from curriculum restraints and college pressures associated with the Carnegie unit pattern of high school course organization allows more flexibility and experimentation in educational choices. Students in the middle school are, however, introduced to subjects they may elect to study in high school. The earlier acquaintance with laboratory subjects and the study of foreign languages offer opportunities for self-fulfillment and accomplishment. The middle school organizational pattern makes it possible to provide more individual attention to students at a time in their development when it is most essential.

*Human Development in the Middle School.* Specialized facilities and subject matter teachers are available to children one or two years earlier in the middle school. This provides an opportunity for the extension of guidance services to elementary children. One of the basic principles of guidance is to place the pupil in a program most suitable for his abilities, needs and interests.

The development of children in grades six through eight in most cases is more similar than that of children in grades seven through nine. They are faced with the beginning stages of adolescence in which they need special attention from their teachers and the guidance staff. Mills (1961) has pointed out the general consensus supporting the inclusion of the ninth grade students in the senior high school and the grouping of early adolescents in the middle school organization.

The social life of the elementary and middle school children is more appropriate when the oldest group is removed from each level. The label "junior" is removed from the middle school grade pattern. Also eliminated are the interschool activities, other types of competition, and forms of social activities which force "growing up" too soon. Most extra-curricular activities are organized for group participation, and athletics programs are typically limited to intramural sports.

*Educational Changes in the Middle School.* According to Hansen and Hearn (1971), the middle school provides outstanding opportunities for flexible modular scheduling, independent study, and team teaching, as well as creativity in the development of new techniques of administration and testing. The middle school facilitates the introduction of some specialization in grades five and six. The usual elementary school program for grades five and six often resembles the program for the lower grades (Compton, 1968). In contrast, students in the middle school are allowed to explore subjects and encouraged to complete assignments suited for each student's peculiar abilities, needs, and interests.

Because of the wide range of individual abilities in this age group, innovative instruction can be used advantageously by subject, if desirable. Each individual may belong to a home-room group within his grade classification, but he may be associated with several instructional groups of various grade levels. As the student makes progress, he may transfer from one group to another. Independent study programs suited to the individual student's interests and abilities can also be used. The student may take advantage of several learning centers, such as a well-equipped library, study carrels, learning laboratories for independent study, as well as programmed instruction or learning activity packages.

Brod indicates that the middle school is no longer a theoretical concept, since it has become “. . . an important aspect of the American educational scene.” She goes on to state that its claims “. . . are passing the test of practical application.” (1966, p. 333) While perhaps not all observers would agree, the middle schools do seem to be meeting their challenges effectively.

### **Disadvantages of the Middle School**

There is a serious shortage of competent and properly prepared teachers for the middle schools. Middle school teachers must be able to understand the early adolescent child and prepared to use innovative teaching techniques. Many teachers find it difficult to adapt to the flexible curriculum plans needed to meet individual student needs.

There is considerable skepticism among educators about the effectiveness of the middle schools. Johnson (1967) cautions that there is no evidence that elementary schools could not achieve the same results as the middle schools by introducing certain facets of secondary education. Post (1968) suggests that “educational gimmickry” may be used in the middle schools instead of genuine educational innovations. He questions the assumption that instruction is stimulated by transferring the ninth grade to the senior high school and the fifth and sixth grades to the middle school. Post also doubts the advisability of placing the ninth grade in the more subject-centered high school setting and the value of increased departmentalization of instruction for grades five and six. Post also draws attention to the social problems faced by ninth grade students in the high school.

A review of the characteristics of the middle school and the junior high school will serve as a summary for this section. The specific differences between the two types of schools are presented in chart form for ready reference between items.

#### *Middle School Emphasizes*

A program that is child centered  
Learning how to learn  
Creative exploration  
A belief in oneself  
Skilled guidance for student  
self-direction

#### *Junior High School Emphasizes*

A program that is subject centered  
Acquiring a body of information  
Skill and concept mastery  
Interstudent competition  
Conformance to the teacher-made  
lesson plan

Students assuming responsibility for their own learning	Student learning is the responsibility of the teacher
Student independence	Control by the teacher
A flexible schedule	A six-period day
Scheduling involving student planning	A schedule administratively constructed
Variable group size	Standard classroom
Use of team teaching	One teacher per class
Students learning at different rates —self-pacing	All students at the same place at the same time; textbook approach

*(The Middle School in Grosse Pointe, p. 5.)*

While some of the functions of the middle schools and junior high schools are similar, the early adolescents involved in both require a special kind of program provided for their unique needs. Advantages and disadvantages have been listed for both patterns of organization. Either plan can be successful or a failure; the effectiveness of the educational program is largely dependent upon the quality of its staff and administration.

### **Administrative Considerations**

Howard and Stoumbis (1970) indicated that administrative duties and functions are much the same regardless of student age groupings, in that each administrator must plan, direct, and evaluate the educational program. Differences occur in student population, curricula, teacher preparation, and facilities, as well as among administrative needs, problems, policies, and procedures.

A list of desirable administrative qualifications may well begin with successful teaching experience; an indication of thorough understanding of the growth, development, and needs of the early adolescent; and evidence of effectiveness in curriculum development. Effective human relations skills are vital, for the administrator must stimulate teacher enthusiasm, permit students and faculty to participate in setting standards, and supply unobtrusive leadership. The administrator is expected to keep his staff informed, to be fair in assigning duties, and to prepare schedules which consider teacher abilities and interests (Howard and Stombis, 1970).

Hansen and Hearn (1971) emphasized the importance of a thorough understanding of the philosophical basis for American democracy and its implications for education. The middle school administrator should exemplify the democratic concepts of leadership. It is also important that the middle school administrator be able to organize effectively, select capable personnel, and work effectively with students and teachers.

Social changes, new concepts in education, teacher and student militancy, a lack of trained teachers, and outside pressure groups who attempt to undermine the principal's authority are grave problems which require competent leadership. The difficulties of this position were well stated by one principal:

Pity the poor principal! He must be a manager, supervisor, psychologist, financial wizard, master of law, public relations specialist, public speaker, school and community leader, a first aid specialist; and throughout it all, he must be a good guy as well . . . . He must inspire, ameliorate, mediate, organize, sponsor, attend, and react properly to pressures. He must try to avoid controversial comments about civil rights, segregation, integration, busing, socialism, automation, strikes, boycotts, unions, protests, the draft . . . and even Custer's Last Stand. In between he is expected to administer a school fairly and squarely. (Moody, 1968, p. 543)

## INNOVATIVE TEACHING TECHNIQUES

Definite individual differences are recognizable among early adolescents, yet there is a common readiness for intellectual stimulation and a striving for independence. These characteristics require an educational program which provides opportunities for developing self-directed studies and flexible scheduling of learning activities. The early adolescent also relishes a wide range of subject matter and exploratory activities. Team teaching and interdisciplinary coordination are effective means of conducting an educational experience which will fulfill his interests and aptitudes. Nongraded schools, which permit students to progress at their own learning rate on individualized and differentiated programs, have demonstrated high levels of success with early adolescents.

### Flexible Scheduling

Instead of the rigid scheduling of the conventional static class periods, flexible scheduling allows different time allotments for the various subjects, or even for different activities within the

same subject area. Such scheduling, using modules or short blocks of time, is used to meet students' individual interests, needs, and abilities, so that the educational program is more appropriate for the unique characteristics of the early adolescent.

Flexible scheduling provides opportunities for independent study, large assemblies of students for formal presentations, and for small group discussions. Many supplemental materials and devices work especially well with modular scheduling; learning laboratories, programmed learning units, and audio-visual materials of all types may be utilized by individuals or groups at almost any time during the school day.

Teachers who work with flexible scheduling must be able to vary the learning time for individual students and must adjust to class sizes which vary from a very few students to relatively large groups for formal presentations. Since classes cannot always be organized in the same order, and since the amount of time for a class is not a constant, it is important that teachers be highly flexible individuals who can adapt to the system.

A typical example of modular scheduling is in the Euclid, Ohio, Junior High School, which has part of its schedule based on modules of twenty-two minutes. Time is allotted according to the needs of the different subjects and their long-range importance to the students. In this situation, the seventh grade has five modules, consisting of three in English, one in art, and one in foreign language, with each course meeting every school day (Bush and Allen, 1963). Another example of flexible scheduling is the Whittier Junior High School in Livonia, Michigan. A two-hour block of instruction is used for English-social studies. The remainder of the class schedule is divided into fifteen-minute modules. Classes vary in the length of time they meet and in the number of days they meet each week (Hudson, 1964).

To be effective, flexible approaches to scheduling require an abundance of teaching materials and supplies, a building conducive to scheduling students in various sized groups for varying periods of time, an understanding administration, and teachers who are committed to the approach. Teachers must expect to devote substantially more time to planning and preparation than they would under a conventional schedule. Many teachers need to develop their competencies in working with

small discussion groups; others find that they must hone their lecturing skills. The student body must be responsible enough to complete their independent study projects and to maintain their involvement in the school program without the constant conventional insistence upon attendance and punctuality. Despite the disadvantages inherent in the flexible scheduling system, it has worked well in many situations (Howard and Stoumbis, 1970).

### **Correlation of Instruction**

Correlation may be defined as the conscious effort to integrate materials, concepts, and learnings (Hansen and Hearn, 1971). The integration of subject matter among the disciplines to provide an orderly program is called the interdisciplinary approach. Aspects of disciplines which are related are introduced by the teacher or team of teachers as the material is needed.

Correlated instruction frequently involves such subject areas as social studies, English, science, mathematics, industrial arts, music, and art. Teachers and supervisors in two or more of the subjects plan and introduce a unit of learning and work together in its presentation. Students receive the guidance of instructors who are expert in their own areas, yet obtain the advantages of the integration of their instructional program. Correlated units may vary in their educational content from a study of a specific period in history to an occupational information unit.

### **Team Teaching**

Team teaching is another cooperative effort in which a group of teachers coordinate their abilities in planning, teaching, and evaluating units of study. Each teacher contributes his expert knowledge and teaching techniques and provides resource materials from his library and his experiences; the team provides the broader body of knowledge and greater professionalization of teaching for an improved curriculum. Teams may involve teachers from only one discipline. However, the usual team involves teachers who have their expertise in different school subjects. Their team efforts then usually may be classified as correlated instruction as described above.

Team teaching requires effective leadership within the team, as well as administrative support. Space and time for planning are perpetual problems, since teachers must work together,

frequently for the first time in their professional careers. Novice teachers may benefit from the in-service experience of working with competent, experienced teachers. However, it is important that the group of teachers be compatible, for they must work very closely together, and students will be quickly aware of dissension among the team. As in many innovative teaching techniques, there is a high demand for supplementary teaching aids and equipment in the team teaching approach (Howard and Stoumbis, 1970).

The Bloomington, Indiana, University Junior High School organized its teaching teams to include a teacher from English, mathematics, social studies, and science on each team (Buffie, 1964). Taylor and Cook (1965) reported on a middle school in California which was organized in three units of 240 students each. A seven-teacher team is assigned to work with each of the three units in grades six, seven, and eight. Each team is assisted by teachers who are specialists in physical education, home economics, industrial arts, and foreign language.

### **Independent Study**

Individualized instruction is especially appropriate for the early adolescent. Consequently, many middle schools utilize their flexibility in scheduling to provide opportunities for independent study. Students may work by themselves or in small groups without teacher supervision. Individually prescribed learning permits each student to move through the basic program at his own pace. For the capable student, it is possible to provide an accelerated program without disrupting his age mates when all are working independently. An adequate independent study program requires the school to provide an extensive collection of resource materials, reference works, audio-visual equipment, and instructional packages consisting of audio-visuals and individual study guides.

Independent study is especially helpful in enabling students to explore an area of individual interest which does not appear in the usual courses in the school. By permitting the individual to follow his elective interests, the school facilitates the development of responsible habits of inquiry, as well as promoting creativity, adaptability, and problem-solving (Rogge, 1965). Students must, of course, accept the responsibility for their own work; this may require teacher assistance and some guidance in

the selection of topics. Teachers must be quite adaptable to work with students of widely differing abilities who are pursuing a divergent array of topics over varying lengths of time. Evaluation of student achievement is a major problem area which must be resolved if independent study is to be used effectively.

### **Non-Graded Schools**

The non-graded schools, sometimes called the "Continuous Progress Plan," eliminates all grade levels and the labels for multiple classes in each subject. Students are allowed to progress at their own speed under the non-graded system.

Proponents of the middle school claim that its organizational pattern is ideally suited for the non-graded classes, wherein some students go through the middle school in two or three years. The traditional promotional or non-promotional dichotomy is eliminated and an unbroken learning continuum is provided. A wide range of exploratory subjects can be offered along with the basic general education subjects.

Howard and Stoumbis (1970) report that pupils in non-graded classes do as well as or better than students in standard classes with a high level of satisfaction, improved student attitudes, and increased effort. Fears of non-promotion are eliminated, a factor which encourages the slow learner and lessens the number of dropouts.

Reorganization to the non-graded system takes careful planning and an effective administrative organization. Students in an ungraded system must understand its purpose, the kind of progress expected, and the methods of evaluation. Provisions must be made for the necessary articulation when a student transfers to or from school systems which are graded. Teachers must not only support the system, they must modify their program and their methodologies as necessary to make the non-graded approach efficient.

The non-graded approach has been used successfully in the Roosevelt Junior-Senior High School in Kansas. Seventh and eighth grade students are placed in one of three levels in each area of learning, with assignment based on student test scores, motivation, interest, maturity, and responsibility; as well as upon teacher recommendations. Evaluation of each student is made weekly by teaching teams for each subject area and appro-

ropriate reassignments are recommended. Students move to a different level when they are ready, rather than on a yearly basis. The school day is organized to provide a three-hour block for a coordinated program of language arts, social studies, and fine arts; a two-hour block for science and mathematics; and a period for exploratory work in practical arts, music, and physical education. Test results showed significant gains from the program at the end of the first year (Howard and Stoumbis, 1970).

### SUMMARY

The early adolescent, the child in the middle, is a unique person undergoing developmental changes which require an educational system cognizant of these special needs. Whether this organizational pattern is the junior high school or the middle school, the key to a successful educational program lies in the hands of highly specialized and qualified teachers and administrators.

Flexible scheduling, cooperative educational efforts, ungraded schools, and independent study programs are all designed to fit the individual needs, interests, and abilities of the early adolescent; yet none of these methods can be effective without well-prepared professional personnel. Teachers and administrators for the junior high schools and middle schools should have special preparation in innovative teaching techniques, educational equipment, and teaching materials; as well as an intensive study of the adolescent in contemporary society. In-service workshops should be used to up-date teaching methodologies and to re-evaluate present curriculum plans.

The journey through the intermediate years in education can be made stimulating, pleasant, and rewarding for the early adolescent if he has the assistance of competent and enthusiastic guides.

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# Curriculum: The Total School Experience

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“A school can adopt a philosophy of education without difficulty, but the real challenge comes in the adaptation to everyday instructional practices.” (Skeel and Hagen, 1971, p. 57) To most educators and laymen alike, the success of the school is determined by the events which occur during the educative process: the curriculum. To the degree that it reflects the stated point of view, the curriculum of the school moves to implement the philosophical position in a direct and meaningful way. Disparity between the point of view and the actual practices in the school are readily apparent to the professionals involved and to the clientele of the school, including the students in the classes.

Curriculum theory is related to theories in education and to theories in the natural sciences. Curriculum theories may be considered to include those which deal with the design of the learning program, theories relative to the most appropriate procedures to be used in the educational process, and theories on the selection of content. The curriculum includes goals, the means for attaining the goals (arrangements of selected subject matter and guidelines for implementation), and provisions for evaluating the learning outcomes. While most discussions of curriculum problems deal with the organization of subject matter for instruction, the larger frame of reference is important if one is to maintain perspective in his professional efforts and in the examination of curriculum questions. (Beauchamp, 1968)

The curriculum may be viewed as the totality of experiences provided by the educational enterprise during the time the learner is in contact with the school. The educator who is concerned with curriculum must therefore consider all the activities provided for all learners in all the classes in the school system. From this point of view, it is inappropriate to discuss the industrial arts curriculum, the science curriculum, the middle school curriculum, or the language arts curriculum in isolation. Such uses of the term may be considered to represent arbitrary restrictions on the application of curriculum development theory to the improvement of educational practice. Ideally, it is a better approach to develop a statement of purpose for the totality of educational experience, then to attempt to allocate activities among the respective grade levels, the various forms of school organization, and the diversity of subject matter specialists.

Frymier and Hawn (1970) point out that most teachers categorize their professional efforts in terms of subject matter courses and grade levels. That is, they consider themselves to be seventh-grade art teachers, ninth-grade English teachers, or eighth-grade industrial arts teachers. It is rare indeed for the individual teacher to indicate his professional concern for the totality of educational experiences which must be provided as a part of the acculturation process. Industrial arts educators seem to be like most of their colleagues in this respect. There are frequent complaints that one's specialty does not get its fair share of the student's time and interests, or adequate space, funding, and recognition in the school program. Perhaps this is the case; the truth or falsity of the charge depends upon the appropriateness of the subject area in the total educational experience.

The global view of curriculum development considers the curriculum to be ". . . a sequence of potential experiences set up in the school . . ." (Smith, Stanley, and Shores, 1957, p. 3) Curriculum activities include setting goals, designing sequences of instruction, organizing classes, implementing instructional methodologies, evaluating changes in student behavior, integrating learning experiences, and providing physical facilities. (Gwynn and Chase, 1969) In this broad sense, virtually the entire repertoire of the educator's activities are in the curricular domain. The concept of curriculum can provide the unifying

theme for philosophy, methodology, measurement, and administration in education.

Inlow (1966) characterizes curriculum decisions as emanating from four areas of choice: educational goals, curriculum substance, teaching method, and evaluation. Starting from such a frame of reference, it is possible to proceed in curriculum planning in several ways: (1) in terms of grade levels, either within or across subject area boundaries; (2) in terms of subject areas across a range of grade levels; (3) from the point of view of a given school level, such as the middle school or the junior high school; (4) as the general framework of a program of study to be followed by a group of students through some portion of their educational experience, such as the college preparatory curriculum in the senior high school; or (5) the total educational program of an individual student during all or some part of his academic career. The specific considerations under discussion in curriculum deliberations are not always directly identified; these must be clearly communicated before one can be certain precisely which aspects of the larger curriculum problem are under consideration.

Contemporary curriculum development tends to focus upon subject matter organization, typically within one of the separate academic disciplines. In the case of many of the academic areas, the leaders in curriculum reform have been scholars in the academic disciplines rather than professional educators. The involvement of secondary teachers and of teacher educators from the subject area has usually followed the preliminary work by academicians.

Most curriculum revision efforts in recent years have concentrated upon the preparation of new and improved instructional materials. The texts, visuals, examinations, and equipment which have resulted from the curriculum projects have been particularly valuable within the subject areas. However, only a restricted range of grade levels has been provided for by most projects, and the diversity of subject matter has typically been rather restricted. Consequently, these programs do not represent grandiose efforts to overhaul all of education—an effort which some might consider overdue. They do provide narrower views of the application of curriculum development than that of an earlier era which was concerned with the total experience of the child. (Woodring, 1964)

Why, then, does curriculum change occur? According to Skeel and Hagen, "Schools initiate change only when it can be proven that the present mode of operation is no longer obtaining the desired results." (1971, p. 71) To the interested observer and participant, the schools indeed seem to cling to old ways of organizing and presenting subject matter until some external force coerces the change in emphasis. Schools, like individuals, respond to the pressures of circumstance, time, and personalities. Dewey observed that "A difficulty is an indispensable stimulus to thinking, but not all difficulties call out thinking." (1961, p. 157) Similarly, a school will respond to pressures, though not all problem situations will elicit thoughtful responses. McMurrin (1964) noted that the schools tend to respond with indifference and lethargy at times when they need to demonstrate deeper commitment to individuals, knowledge, and the total life of our society.

Industrial arts, as a subject within the schools, operates within constraints which are similar to those affecting other subjects. The school subjects must be related and integrated into a basic program for each learner over a period of several years. Thus, as industrial arts responds to pressures by attempting to evolve appropriate curricular responses, it is imperative that curriculum workers retain the perspective of industrial arts as a contributor to the comprehensive educational development of the learner.

### CONTEMPORARY CURRICULUM PATTERNS

Curriculum development in recent years has been characterized by a diversity of approaches. In some subject matter fields, curriculum development activities have concentrated upon the organization of a program of study within the respective disciplines. For instance, mathematics programs have been developed to cut across a wide range of grade levels. In other cases, the emphasis has been upon the development of a program for a specific grade level, a group of grade levels, or a school pattern, such as the middle school. Some approaches have been the responsibility of professional educators; others have utilized specialists in the relevant disciplines. Mathematicians have assisted mathematics educators in the development of some "new math" programs. Similarly, physicists have been heavily involved in physical science curriculum reorganization attempts.

Before turning to an examination of the specific subject patterns in a later portion of this chapter, it seems appropriate to discuss the typical programs which characterize the different schools in contemporary education, focusing upon each educational level in turn.

### **Elementary Schools**

Most elementary schools utilize some variant of the self-contained pattern of organization. In this plan, the elementary classroom teacher is responsible for the total instructional program of each of the students in his class. Some assistance is frequently available from consultants who are specialists in certain areas. Music, art, and physical education are the areas most frequently represented by specialists who either visit the regular classroom for lessons in their area, or take groups of children from the classroom for specialized instruction.

Departmentalization, the use of teachers to teach in a restricted range of subjects, most frequently appears in the intermediate or upper grades. Departmentalization is often utilized in some combination with self-contained classroom patterns. Music, art, and physical education are frequently departmentalized, as described above. As students progress through the grades, their interests and aptitudes tend to become more specific. Their achievement in school subjects frequently seems to be fostered by teachers who themselves possess a degree of depth in the subject area.

Rather than attempt to discuss each subject in the elementary school curriculum and its specific contribution to the educational process, it seems appropriate here to explore the role of industrial arts in the elementary grades. Industrial arts educators are relatively consistent in their recommendations concerning industrial arts experiences which should be provided in the typical school by the teacher in the self-contained classroom. The assumption is usually made that outside assistance is available to the classroom teacher in the form of in-service teacher education, a consulting industrial arts specialist, or special facilities within the school.

The American Council of Industrial Arts Supervisors emphasizes the role of industrial arts in supporting overall educational objectives and enriching the activities in other subject areas:

“The activities in industrial arts place emphasis upon the planning and construction required in meeting needs that arise as pupils participate in English, mathematics, science, and social science activities.” (1969, p. 6) Within this context, there is the expectation that the classroom teacher will integrate industrial arts activity into classroom experiences, using the activities to improve motivation, to provide an opportunity for participation in constructive, creative pursuits.

Industrial arts instruction in the elementary school is shown to be related to the curriculum unit, to overall educational objectives, and to each of the curriculum areas in an excellent discussion by Scobey (1968). She points out the close relationships of industrial arts to mathematics, science, language arts, and fine arts. The social studies program, with units organized around basic human activities, is especially appropriate for close coordination with industrial arts activities. Scobey indicates that industrial arts activities may appropriately supplement instruction in each of the nine areas of human activities selected by Hanna (1956) for the social studies: (1) protecting and conserving life, resources, and property; (2) producing, distributing, and consuming food; (3) creating and producing tools and techniques; (4) transporting people and goods; (5) communicating ideas and feelings; (6) providing education; (7) providing recreation; (8) organizing and governing; and (9) expressing spiritual and aesthetic impulses.

The developmental contributions of industrial arts in the elementary school are emphasized by Miller and Boyd (1970). While they do not ignore the reinforcement of achievement in other subject areas, Miller and Boyd discuss the use of industrial arts activities to foster individual development in problem solving skills, the development of the ability to apply knowledge in practical situations, and the provision of an opportunity for students to express themselves creatively by building or constructing objects. The kind of industrial arts programs they recommend for the elementary school emphasizes constructional activities in the classroom.

As a part of the elementary school program, industrial arts can further intellectual development, provide for individual differences, offer socializing experiences, present basic occupational information, acquaint children with the cultural heritage, and

teach fundamental skills. (Gerbracht and Babcock, 1969) The activity base of industrial arts is considered to be especially helpful in motivating children and in making the schooling process a pleasant experience for them.

One cannot help but be somewhat disappointed when he examines the recommendations of elementary education specialists for the elementary school curriculum. Industrial arts educators maintain the importance of industrial arts experiences in the elementary school and assert the usefulness of the industrial arts activities in making the elementary instruction in other subjects meaningful. Evidence indicates that elementary educators are completely avoiding industrial arts in many instances, and providing only minimal opportunities for industrial arts to contribute to the educational development of the elementary-aged child.

In describing the curriculum for the contemporary elementary school, Hicks, Houston, Cheney, and Marquard (1970) devote chapters to science, mathematics, social studies, language arts, reading, fine arts, and physical education. Despite the quite thorough coverage of new curriculum developments in science, mathematics, social studies, and linguistics, the book avoids a discussion of industrial arts courses, experiences, and activities completely. Wright, Camp, Stosberg, and Fleming (1971) provide an effective discussion of the psychological foundations of the elementary curriculum, of the sociological influences upon the schools, and of the guiding role philosophy can play in curriculum planning and teaching in each of the traditional elementary school subject areas: language arts, social sciences, science, mathematics, health and physical education, art, and music. They do not extend their discussions to include industrial arts. Keith, Blake, and Tiedt (1968) provide an excellent review of the development of the elementary school curriculum in terms of its history, its aims, and contemporary organizational schemes. However, they, too, do not consider industrial arts as a part of elementary education in their discussions.

Industrial arts has not been an especially popular subject in the elementary school, if one uses its actual acceptance as the criterion. That is, relatively few elementary schools—at least in terms of the percentage of the total number of such schools—actually provide industrial arts experiences. In the first place,

very few elementary school systems employ a professional consultant for industrial arts. Thus, there is a lack of direct stimulation for the development of a program. Elementary classroom teachers who want to provide in-class activities normally considered to be industrial arts have no one to whom they can turn for assistance. Consequently, there is a definite tendency to avoid involvement without professional encouragement.

As a further problem, most elementary teachers have had only a minimal exposure to industrial arts activities as a part of their professional preparation. Many teacher certification programs do not require industrial arts as a part of the elementary pattern; those that have such a requirement do not demand the depth of preparation that is expected in mathematics, science, language arts, or social studies. Teacher education, including in-service teacher education for the elementary teacher, has not provided adequate assistance and stimulation in industrial arts activities.

There are noteworthy exceptions on the contemporary scene. The Technology for Children Project has made major strides in assisting the teacher in the self-contained classroom. The Project has devoted considerable effort to teacher education activities and demonstration classrooms where children use tools and materials to develop understandings in the traditional school subjects and develop work-related attitudes. The Project is currently reaching more than 13,000 children in New Jersey. (Simonson, 1971) Other efforts also offer promise for better days to come for industrial arts in the elementary school (Mandes, 1971), but there are substantial obstacles to be overcome before industrial arts assumes a secure role in elementary education.

### **Middle Schools**

Since both the middle school and the junior high school received specific attention in Chapter IV, it is not necessary to repeat detailed descriptions here. The middle school has appeared on the American educational scene as an alternative to the junior high school. Where the middle school organizational pattern is utilized, grade nine is usually placed in the senior high school and the middle school serves grades six, seven, and eight. Sometimes grade five is also included in the middle school, though this pattern is not dominant at the present time.

The middle school seeks to meet the educational needs of the early adolescent by using a unique combination of organizational techniques. The basic instruction is departmentalized, though students are typically scheduled for blocks of time with individual teachers for instruction in such areas as English and social studies or mathematics and science. The degree of block scheduling decreases as the student progresses through the grades. Innovation is the hallmark of the middle school, with its emphasis upon intellectual development and its atmosphere free from social, academic, and athletic pressures. (Howard and Stoumbis, 1970)

Individualized instruction is emphasized, using a variety of learning resources, flexible scheduling, and independent study to maximize the opportunity for individual development. Electives are permitted at all grade levels to complement the common learnings program in language arts, mathematics, science, fine arts, and health and physical education. Industrial arts, home-making, art, music, arts and crafts, and typing are frequently available to students in each grade. Grouping is typically homogeneous for the academic courses and heterogeneous for non-academic classes. The academic program is supplemented by a wide variety of basic club activities with minimal attention to the competitive aspects of the activities. (Hansen and Hearn, 1971)

The middle school has recently been the subject of concentrated attention by the American Council of Industrial Arts Supervisors (1971), which has formulated goals and performance objectives for industrial arts as a separate subject or as a unit in the middle schools. Their specific recommendations for facilities, equipment, and operating guidelines should be most helpful to educators in the middle school, particularly when industrial arts is taught as a separate subject.

Industrial arts in the middle school frequently plays a major role in unified arts programs. However, the complete integration of industrial arts, art, and home economics (the typical subjects brought together in the unified arts approach) is extremely difficult. Teachers have been prepared to teach in their specific subject areas; most have little, if any specific preparation in the other subject areas in the unified arts. Consequently, there is a tendency for the programs to consist of a schedule rotating students through the traditional areas.

To be fully effective, the unified arts program needs to have a degree of melding which is perhaps difficult if not impossible of attainment. "A truly unified program is characterized by amorphous content which has lost most curricular lines and which was developed cooperatively, taught in a team fashion, and dependent upon substantial contributions from each discipline." (Porter and Seal, 1969, p. 5) If the unified arts approach is completely adopted and effectively implemented, industrial arts must lose its separate identity. The same is also true of the other subject areas. It is not yet clear whether this is an advantage or a threat to the integrity of the subjects involved.

What is most often found in the middle school is some compromise between the two extremes: industrial arts as a separate subject and a fully-integrated unified arts program. Teachers in the unified arts typically integrate their instruction across subject matter boundaries and schedule an appropriate sequence of experiences for the students. However, each teacher tends to concentrate his instructional efforts upon a relatively restricted range of content, usually that which relates most closely to his area of specialization. There is a minimum of correlation or team teaching to unify the program.

There may be some question whether the middle school has yet evolved as a unique institution, as one which will establish and maintain an identity of its own over the long haul. Contemporary works on the middle school have not established a clear status for the institution. Many could have been written for the junior high school and modified to read "middle school." If the same sort of ambiguity characterizes the middle school curriculum patterns, one should not be surprised to note that the industrial arts program in many middle schools looks exactly like the junior high school industrial arts sequence, with the possible exception that the courses may begin one year earlier.

### **Junior High School**

The junior high school most frequently serves grades seven, eight, and nine, though this grouping is by no means universal. It shares the characteristics, strengths, and problems of the senior high school, but also bears an extremely close relationship to the middle school as we have come to know that institution in recent years.

The instructional program in the junior high school is almost entirely subject-centered, with very little integration of content across subject areas. Therefore, curriculum improvement occurs within individual subject areas, rather than across large areas of the school curriculum.

At the junior high school level, students demonstrate considerable variation in ability. By the time they reach this age, students with the maximum potential for learning in a specific subject are far more advanced than their typical age-mates in terms of the ability to master the subject matter. Slow learners have become progressively farther behind their grade norms; the disparity begins to reach crisis proportions by the junior high school years. Grouping is one means the school uses in an attempt to accommodate differential abilities. Specialized subjects are frequently made available to students interested in electing them; similarly, compensatory programs are quite common in the junior high school.

There are rather specific, identifiable pressures upon students to make at least a tentative selection of a career by the junior high school years. To some degree, career selection interacts with course election; the academically able are encouraged to select courses related to college entrance requirements. Enrollments in industrial arts are clearly affected in an adverse way in the elective program in the junior high school. In almost every instance, a disproportionate share of the capable students avoid industrial arts simply because they elect another subject.

It is in the junior high school that one is most likely to find the required industrial arts courses for all students. The commonest grade level for the required course is grade eight, with grade seven nearly as popular. (Schmitt and Pelley, 1966) Girls are most likely to be enrolled in industrial arts during one of these two grades; relatively few schools provide coeducational industrial arts courses in the junior high years.

In the separate subject pattern of organization which typifies the junior high school, industrial arts is typically considered to be one of the "specialized" subjects. Some schools have developed courses aimed specifically at meeting the pre-vocational or vocational needs of the student who is likely to leave school before high school graduation, and perhaps before the completion of the junior high school. (Burchill, 1962) During the later years

of the junior high school, particularly in grade nine, there is a clear need for more than one type of emphasis in industrial arts courses if the subject is to meet the needs of the students. Few schools provide appropriate industrial arts experiences for the academically talented, the scientifically inclined, the visually handicapped, or the slow learner.

### Senior High School

That venerable institution, the senior high school, has survived recent periods of curriculum investigation, educational innovation, and social change with relatively few scars of battle. The school is highly departmentalized, with rigidly scheduled separate subjects taught by specialized teachers. Few senior high schools make serious attempts to relate the subjects of study to each other or to the real world of today and tomorrow.

The basic concerns in the present volume center upon the educational program for the early adolescent. For practical purposes, the decision has been made to include programs for grade nine but none of the subsequent grades. Therefore, the senior high school curriculum becomes a concern to the study when grade nine is assigned to the institution. Probably the chances are about even that grade nine will be in the junior high school or in the senior high school. The fact that grade nine is included as a part of the "high school record" means that the ninth grade tends to resemble grades ten through twelve more than it is similar to the eighth grade, whether the eighth and ninth grades are in the same institutional setting or in different schools.

Some form of grouping is an absolute administrative necessity when large numbers of students with widely varying abilities must be run through the maze of the tightly-structured schedule in order to meet graduation requirements. Three basic patterns are readily apparent in most comprehensive senior high schools: college preparatory, vocational, and general. Many minor variations appear in some settings, but these three are found in some form in virtually every high school.

Senior high schools have traditionally emphasized the college preparatory curriculum, designed to prepare the able student—or the partially able—for collegiate study. Mathematics, science, English, social studies, and modern foreign languages have frequently been prescribed: one of each for each of the four years.

Conant (1967) adds physical education and art and music. One gets the impression that there is no upper limit to the number of courses which could be taken in these areas nor to their difficulty levels. The schools sometimes seem compelled to encourage each potentially able student to meet the requirements for entrance into any college or university. Consequently, recently graduated high school classes have been exceptionally well prepared for college, at least in terms of their mastery of the subject matter in the traditional college preparatory courses.

Vocational curriculum patterns in the senior high school are intended to prepare the student to enter occupations related to the programs in which they are enrolled. In some senior high schools, the vocational curricula are comprised of exceptionally well-integrated sequences of subjects, including exploratory and specialized instruction in the occupational areas, as well as instruction in mathematics, science, and English which is carefully related to the career goals of the students. In these sequences, the ninth-grade industrial arts courses are typically generalized or exploratory in emphasis, though they have a clearly career-oriented intent.

Since their inception as reimbursable programs under the Smith-Hughes Act, vocational curricula in the high school have tended to concentrate upon the preparation of individuals for entry into the skilled occupations. Until quite recently, there were few programs for semi-skilled occupations or for vocations which require less than high school preparation for entry. However, recent developments to provide for a broader range of career opportunities in the vocational curricula have made the program more responsive to the needs of contemporary youth. At the same time, the problem of curriculum planning has become more complex, since the newer programs require coverage of academic content in ways which will be useful for disadvantaged students and potential dropouts, as well as for students who are likely candidates for post-high school occupational preparation in community colleges or technical institutes.

Students who do not enroll in either a college preparatory program or a vocational curriculum are usually classified in the general curriculum. There is a lack of agreement upon the components of the general curriculum, since there are few unifying characteristics. The general curriculum has been under fire by

many educational critics. Evans has noted that "The general curriculum in the secondary school has so little to commend it that it is sure to disappear." (1971, p. 278) Many of the weaknesses which have been exposed are of the kind which should be expected. Students do not really elect the general curriculum, they are placed in it by default. It is doubtful that any program could be conceived and implemented to meet the divergent needs of the motley assortment of students in the general curriculum. However, by attempting to provide for all youth not pursuing either the vocational program or the college preparatory program, the general curriculum has not really provided much progress toward a clear-cut goal for any of its clientele.

The basic contention here is that the fundamental problem is not with the general curriculum. While it may not be appropriate, there is some reason to question whether any single program can be evolved for the large group of students who need something other than the traditional, academically-oriented secondary education. We have reached the stage of educational sophistication where we can think in terms of a multiplicity of programs designed to meet the needs of relatively homogeneous groups of learners. Much of the instructional technology is available; many of the needed personnel are prepared. What is needed is a clear-cut plan and the necessary monetary and professional commitments.

The senior high school curriculum is an incredibly difficult and persistent problem to which educators must eventually address their attention if we are to continue to insist that all youth participate in secondary education. Evans (1971) has suggested that the vocational curriculum and the college preparatory curriculum be merged to form a single curriculum with a general education base. He points out the fact that schools would be forced to delete requirements in many academic areas to do this, and that curriculum projects would need to develop materials which would be understandable to and useful for students who are not college-bound. Marland has gone one step further: "True and complete reform of the high school, viewed as a major element of overall preparation for life, cannot be achieved until general education is completely done away with in favor of contemporary career development in a comprehensive secondary-education environment." (1971, p. 28) If either of these pro-

posals receives widespread attention, the curriculum of the senior high school could indeed be subjected to radical revision. For the present, these seem to be promising potential directions which have not yet made significant impact.

At the senior high school level, industrial arts seeks to serve the needs of youth enrolled in the three basic curricular patterns: college preparatory, vocational, and general. It is not really possible to be all things to all people without providing some specialization in the form of individualized alternatives.

Industrial arts educators are quite indefinite when they attempt to provide precise guidelines for industrial arts programs in the senior high school. There is a tendency to attempt to continue what was begun at an earlier educational level: "The well-rounded high school industrial arts curriculum includes opportunities in areas not provided at the junior high school level, plus opportunities for advanced experiences in areas previously studied." (American Council of Industrial Arts Supervisors, 1969, p. 8) The ambivalence between exploration and specialization is indicative of the problem faced by educators in the field.

On one hand, there is a long heritage of pre-vocational and vocational interests, emphases, purposes, and courses. An impressive array of leaders have argued for this approach. As a countervailing force, there is a vocal and active group which has insisted upon the importance of retaining the general education characteristics of industrial arts against every tinge of vocationalism. The confrontation between these two groups is most vigorous, obvious, and violent at the senior high school level.

Each side seems content to let the other side offer courses to meet its own peculiar purposes, at least so long as such gratuitousness does not interfere with the provision of courses oriented to one's own frame of reference. However, when the courses offered for vocational purposes begin to eliminate the general education courses, one may expect to hear some protests. Similarly, vocationally-oriented groups become vocally discontented if their pet courses are impinged upon or restricted by the "general education" courses. There is little controversy over the college preparatory students in industrial arts in the senior high school: everyone agrees that something should be done for them, but few have made serious attempts to meet their needs.

## GUIDELINES IN CURRICULUM DEVELOPMENT

Curriculum development involves far more than the simple selection and arrangement of subject matter. No individual or specific methodology can provide adequate guidance and leadership for all facets of a major curriculum revision effort. It is possible to approach the process of curriculum development from the specialized viewpoints of many individuals: psychologist, subject matter specialist, administrator, supervisor, teacher, or evaluator. These professionals are all involved in comprehensive efforts to modify the curriculum in any subject area, including industrial arts. Each specialist brings to the curriculum development process the peculiar strengths, strategies, biases, and approaches which arise from his professional background and experience. All must be especially careful to consider the curricular foundations which arise among the other specialities.

### Psychological Bases

“The psychological curriculum may be defined as the sum of the experiences—the learnings, skills, habits, and attitudes—that the child has made a part of himself, and that govern his behavior, as a result of the environment provided by the school.” (Shane and McSwain, 1958, p. 170) What is important is not what is visualized and organized by the curriculum worker, nor what is presented by the teacher, but what is accepted, internalized, and utilized by the learner. “What things really are is never as important as *how things seem to be*—people act according to the facts as they understand them.” (Frymier and Hawn, 1970, p. 25)

The currently popular cry for “relevance” in education is but a symptom of the importance of meaningful learning. As Borton has noted: “It is as though we teachers have become so accustomed to teaching irrelevant curricula that we can hardly believe that it is possible to teach material which actually could make a difference not only to our students’ lives but also to our own.” (1970, p. 175) Traditional emphasis upon thorough organization, with uniform patterns, products, and approaches may stifle student interest and create a sterile environment for learning. Meaningfulness is an elusive quality, a variable across time and subject matter, but a fundamental imperative in the design of educational experiences.

An understanding of psychological bases of the program is vital in establishing scope and sequence parameters in any curriculum endeavor. Individual needs for achievement, development, and emotional security establish priorities for the organization of instruction. The central role of learning in education mandates careful attention to the psychological bases for the organization of the curriculum.

The learner is of primary concern in any educational undertaking; the curriculum must be developed with full cognizance of his background, status, needs, and goals. As the perceived psychological processes involved in learning have changed through the years, so have the bases of the curriculum been modified.

Readiness has traditionally been a principle of such widespread acceptance that few educators even considered the possibilities of questioning it. Bruner, however, turned curriculum development around with the statement: "We begin with the hypothesis that any subject can be taught effectively in some intellectually honest form to any child at any stage of development." (1961, p. 33) In subject after subject, curriculum workers sought structural elements which could serve as organizational schemes. Using these models, subjects were organized for presentation to younger learners than had traditionally studied the content.

Motivation, reinforcement, and transfer are emphasized by Michaelis, Grossman, and Scott (1967). They also point out the importance of meaningfulness, discovery learning, and the study of selected topics in depth. Gagne (1965) explored the psychological principles involved in different types of learning tasks. Hunt (1961), on the other hand, emphasized the primacy of the developmental stages of the learner upon the learning process.

### **Social Bases**

Man is a gregarious animal. Even when he pursues the learning process, an individual effort in the extreme, man seldom works in complete isolation. The social milieu of the classroom, the school, and the community are primary determinants of the educational experience.

One of the traditionally accepted functions of the school is the transmission of the culture; society provides the foundation for curriculum development. Ours is not one homogeneous

society, but many sub-cultures. Diversity in the culture is reflected in the curriculum, in the classroom, and in the social interactions which accompany the educational process.

Perhaps the social climate within the school is overlooked at times; yet it is one of the primary determinants of effectiveness in teaching. The basic classroom group is perhaps the most obvious example. Each class is comprised of informal and formal peer groups which interact with each other and with the teacher. The teacher himself is not only a member of the classroom group, he is also involved in within-school professional groups and is a member of the larger community. (Wiles, 1963)

Classroom groups must be treated as social entities which reflect the values of young people. Curriculum planners must devise sophisticated presentation schemes to compete effectively for the attention of youth who have become accustomed to professionally-prepared techniques in a multi-media approach. Too little has been done to meet the expectations of contemporary early adolescents; their lack of acceptance of many school tasks deters even the most serious student from becoming involved in the activities of the classroom.

Nor can the school ignore the various folkways which arise among the adolescents at any period. Youth has frequently felt that its cause has been unfairly treated by the "establishment" which has perhaps been most visible in the formal school. Nowhere has the conflict been more apparent than in contrasting folkways in hair length and clothing styles. One of the paradoxes of recent times was the schools' reactions to skirt lengths. When the "mini" was the rage, schools were concerned about short skirts and devised criteria for acceptability—that is, when "short" was "too short." As skirt lengths took a sudden plunge to floor level, the schools were on the job again, deciding that there was also a "too long." Indeed, there was a trying period when skirts could be either too long or too short to meet dress standards in certain schools. Unfortunately, there was never a similar time when teachers could be openly taken to task by students because their lessons were either too stimulating or too boring.

Curriculum builders must also devote their attention to understanding the various groups and strata within the community served by the school. Relationships among these groups and

between them and the school may determine the success or failure of a curriculum innovation. A community of college-oriented parents may need to be convinced of the value of career development programs; working class communities may not. Similar kinds of reactions may be anticipated in most communities, though the degree and direction of the reactions will not be consistent from community to community.

### **Subject Matter Bases**

One of the most prevalent approaches to curriculum development is based upon the assumption that organized bodies of knowledge, or disciplines, may serve as the source of the content for school subjects. The tendency in this procedure is to focus upon an individual school subject, attempt to select the subject matter from relevant disciplines, then to order the content into a teachable sequence.

With this method of improving the school curriculum in rather widespread vogue, a variety of curriculum revision efforts have operated in mathematics, the sciences, English, and most other areas of the school curriculum. There is some difficulty in relating the work which has been done in one subject with that which has been accomplished by a project working in another area. In addition, it is often almost impossible to synthesize the output and recommendations of two or more curriculum projects devoted to the improvement of a specific subject at a given grade level.

As publicity, funding, and professional efforts are devoted to certain subjects, others find their niche in the educational spectrum less secure than before. "Teachers of fine and applied arts have fought a lonely battle to secure a foothold in the regular school curriculum and to maintain it . . . there is ample evidence of budgetary and curricular erosions to make room for the increased emphasis on the so-called 'hard-core' subjects." (Goodlad, von Stoephasius, and Klein, 1966, p. 83) Various levels of popularity and status have been attached to the respective subjects as their curriculum development efforts have struggled through times of low funding into periods of prosperity.

The time-honored approach to the organization of instruction is closely related to the subject matter base for the curriculum. "The idea that so much ground must 'be covered' is another

value many hold, despite the fact that experimental evidence demonstrates conclusively that ground covered or facts acquired are only significant to the degree students are able to attribute personal meaning to each bit of information." (Frymier and Hawn, 1970, p. 27)

There are frequent tendencies in the curriculum literature to return to the bodies or organized knowledge, the disciplines, for curriculum guidelines and content. King and Brownell, after emphasizing the central role of curriculum revisions in the school and examining contemporary curriculum theories, re-emphasize the importance of the study of the disciplines. "We defined the curriculum as a planned series of encounters between a neophyte and the communities of symbolic discourse." (1966, p. 213) Inlow represents a more moderate view, though he too recognizes the importance of the disciplines. "We question, at this point: (1) whether the disciplines are the only way, and (2) whether the theory of structure has been sufficiently developed to serve as the sole axis of the disciplines." (1966, p. 16) This perennial controversy may be expected to continue. In the meantime, every school subject walks the narrow road between discipline-oriented and student-oriented curriculum planning.

### **Extracurricular Program**

The extracurricular program—that part of the school's effort in which subject matter is optional and activities are largely student-chosen, may be considered to be an integral part of the curriculum. Extracurricular activities provide the individual an opportunity to explore an area on his own, with a minimal penalty for failure or poor performance. The extracurricular program can offer significant potential for individual development in many areas, not all of which are represented among the formal courses in the school.

Extracurricular activities can serve to reinforce learnings acquired in the student's course work. The Future Farmers of America have been an almost intrinsic part of instruction in vocational agriculture for many years. Active members of FFA have opportunities to explore a variety of activities and to participate in individual and group competitions.

Other vocational areas have active extracurricular counterparts. Future Business Leaders of America and Future Home-

makers of America have provided supplementary activities for students in business and in home economics education, respectively. The Vocational Industrial Clubs of America have substantial vitality on the national scene. Distributive Education Clubs of America and the Office Education Association enroll interested youth and encourage their development in areas related to their course work.

Industrial arts programs in many schools have not been supported by closely affiliated extracurricular activities. Some teachers have been effective in developing and maintaining active clubs for students in industrial arts courses; one is described in Chapter VII. The American Industrial Arts Association has revitalized its emphasis upon student clubs, an area where much needs to be done.

A closely related extracurricular activity can capitalize upon the intrinsic motivations of students to stimulate them to high levels of achievement in their formal course work. All subjects in the school can benefit from such student involvement; fortunately, many areas are actively promoting extracurricular opportunities.

### **ROLE OF INDUSTRIAL ARTS IN CURRICULUM DEVELOPMENT**

The next chapter deals specifically with curriculum development in industrial arts. Before turning to an examination of the curriculum revision process within industrial arts, it seems appropriate to review the relationship of industrial arts to the total program of the school. In view of the discussion in the present chapter, two alternatives are possible: industrial arts may be viewed as a separate subject, with its own independence, integrity, and approaches; or industrial arts may be considered to be an integral part of the total curriculum.

#### **Separate Subject**

Industrial arts tends to be perceived as a separate subject by most educators. It is organized without substantial integration with other school subjects, and is taught as an independent subject in most schools. Scheduling and teaching procedures tend to encourage the relative isolation of industrial arts, even in schools in which other subjects are taught as broad fields, integrated blocks, or in correlated groupings.

In comparison to most of the school subjects, industrial arts was a late starter in curriculum revision during the decade of the sixties. Even the major curriculum projects in industrial arts have been quite small when compared to projects in other school subjects. It should come as no surprise that industrial arts programs in the 1970's look much like the programs in the 1960's; there has been too little time, too little money, and too few people devoted to the task of curriculum revision.

### Integrated Curriculum

Perhaps the ideal contribution which could be made by industrial arts in the educational enterprise would be as an integral part of the total curriculum, rather than as an independent, separate subject. Sometimes industrial arts is perceived as an integral part of the total school experience for some students or groups of students. Even in this case, it is usually scheduled for a specific period of time each week, thereby maintaining some of its separate subject characteristics.

Industrial arts activities can be truly an intrinsic part of the potpourri of experiences in the school. The success of the Technology for Children Project in providing such an integrated assortment of experiences is indicative of the possible contributions of an integrated approach. Experiences in industrial arts do not have to be used as organized sequences complete in themselves; they can be used effectively in combination with experiences in other areas. This, of course, has been a standard doctrine for a long time, but relatively little has been done to bring it about. In the words of Will Rogers, "Things ain't what they used to be and probably never was."

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# The Industrial Arts Curriculum for the Early Adolescent

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The Twentieth Yearbook of the American Council on Industrial Arts Teacher Education (Ray and Streichler, 1971) began with a discussion of the chronological impact of teacher education. Their estimates are highly plausible in terms of the time required to effect change in teacher education, for students to be prepared under the modified teacher education program, and for the teachers to attain the fulfillment of their teaching careers. Future teachers who enroll immediately in teacher education programs which have been altered to reflect the contemporary scene may expect to continue teaching until approximately the year 2020. Looking at the opposite set of countervailing forces influencing the industrial arts teachers (or any other teachers, for that matter) of the day and the lag between teacher preparation and the completion of teaching careers is also helpful in attaining an understanding of factors affecting curriculum.

For the purposes of this discussion, let us assume that the teacher who is retiring at the end of the 1971-1972 academic year has taught for forty years following the completion of a four-year undergraduate teacher education program. This would indicate that the teacher's outlook and his basic academic preparation were shaped in the milieu of the late Twenties and the early Thirties. One might profitably consider the changes which have occurred in the years between the beginning and the end of the

individual's career. The state of industrial development in 1928, its associated technology, the body of knowledge about the teaching-learning process, and a productive system highly dependent upon the skills of individual craftsmen combined to shape the teacher education curriculum of the day and the outlook of the beginning teacher. When one considers the fact that the Ford Tri-motor was the principal commercial aircraft in 1928, that the Model A was the latest thing on wheels, and that the first commercial radio station was only eight years old, he can readily understand how traditional curriculum patterns became embedded in the educational structure.

### **THE TRADITIONAL PROGRAM**

The political realities of the 1968 presidential election and the current situation in industrial arts education are remarkably similar. In 1968, the nation was wracked by dissent and criticism of established institutions and procedures. There were widespread calls for extreme change. On the one hand, there were demands for the return of many governmental functions and decisions to the state and local levels of government. This conservative position, championed by George Wallace, generated widespread and enthusiastic support. Equally vigorous groups supported the liberal proposals of Eugene McCarthy. Between the two extreme positions was a large segment of the populace who agreed upon the need for change, but did not accept the need for radical or complete change. The successful presidential campaign of Richard M. Nixon was aimed at this large, undefined "silent majority" who either were satisfied with existing conditions or were unable to articulate their discontent.

The situation facing industrial arts education today is not unlike the conditions which existed during that presidential election. On the one hand, there are outcries of liberal thought which recommend that the profession set aside all facets of current practice and replace them with totally new programs. The conservative element, on the other end of the continuum is calling for retrenchment in tried-and-true practices which have been the central elements of industrial arts courses and programs. Between these two vocal and highly visible groups may be found the majority of the practitioners in industrial arts

education. These are the professionals who meet their classes daily, who change their course content gradually to meet changing conditions and interests, but who never make any audible noise about their programs. These are the people who are running programs that most often are labeled "traditional."

Identification and definition of programs that are, in fact, traditional is as difficult as the identification of members of the "silent majority" among the body politic. It will be recalled that members of the press had a field day with the "silent majority" label. They rightly identified several sub-groups within the middle ground of American political thought who had no majority bonds at all. As a matter of fact, the groups were often working toward mutually exclusive goals. What made them a majority was their silence. The same may be true of traditional industrial arts programs. These programs are frequently very different from each other. Some of them emphasize skill development, others have pre-vocational goals, and still others center upon recreational or leisure-time goals. Therefore, perhaps the major similarity among these programs and the professionals who conduct them is their silence on the national scene.

The silence of the majority of practitioners in industrial arts education makes accurate description of ongoing programs difficult, if not impossible. An adequate description of these programs is unavailable; little information has been published to clarify the current status of industrial arts. Several researchers have looked at contemporary programs, typically as part of their graduate degree requirements. Thus, most studies lack the scope and consistency necessary to create a clear cut picture of the present status of industrial arts education.

One national study of the status of the industrial arts education deserves special mention here. Schmitt and Pelley (1966) reported on their comprehensive survey conducted during the 1962-1963 academic year. They identified over 202,000 industrial arts classes in public secondary schools, with a total of 76 course titles. However, the courses concentrated in four areas: general industrial arts, general woods, drafting, and general metals. Power mechanics, graphic arts, and electricity/electronics were not frequently offered. While these data will be ten years old by the time of the publication of the present volume, one might

assume that they are still fair representations of the actual situation. Change comes about quite slowly in industrial arts education, as indicated by the 1962 emphasis upon woodworking, metalworking, and drafting; there are few indications that local programs have changed markedly during the decade since Schmitt and Pelley completed their survey.

An informal glimpse of the actual situation in industrial arts education may be obtained from an examination of the catalogs of major firms supplying industrial arts supplies and equipment, as well as the advertisements in periodicals published for industrial arts teachers in the secondary schools. Woodworking tools, machines, and supplies receive substantially more space and more prominent locations than those devoted to materials, supplies, and equipment for other areas. Similarly, finishing materials which are regularly advertised are usually those for finishing woods, with some provision for metal finishing, especially automotive refinishing. These trends should not be considered as criticisms of the suppliers. Indeed, many firms have taken substantial economic risks in pioneering efforts to stimulate curriculum change in industrial arts. It does appear, however, that the present status of the industrial arts program is reflected in the merchandise which is readily available, promoted, and purchased for the schools. Such an unobtrusive measure of the situation may be as accurate and as comprehensive as a more formal study.

Traditional industrial arts programs for the early adolescent may be classified into three categories. These programs are characterized on the bases of their relative instructional emphases, rather than their formally stated objectives. As a result, there is a degree of overlap among the offerings in terms of activities and intended outcomes. Nevertheless, there are enough differences to make it possible to categorize them as: skills emphasis programs; pre-vocational programs, and leisure-time emphasis programs.

### **Skills Emphasis Programs**

The oldest and most firmly established curriculum pattern in industrial arts education is the program with a strong emphasis on the development of skill in the use of hand tools and machines. The primacy of the development of skills has its roots

in the manual training movement of the nineteenth century. It therefore predates by nearly fifty years the general-vocational dualism created by the establishment of special funds for the development of specific skills in vocational industrial education programs. Contemporary practice is, of course, influenced by tradition and by legislation; these particular influences are explored below under the discussion of pre-vocational curriculum patterns.

The skills emphasis of contemporary industrial arts education is firmly rooted both in the day-to-day efforts of the classroom practitioner and in the pronouncements of major professional organizations. The most recent publications of two highly influential professional associations (American Council of Industrial Arts Supervisors, 1969; American Vocational Association, 1968) list the development of skill in the use of tools and machines as a primary goal of industrial arts.

The historical evolution of industrial arts has been characterized by a slow but perceptible trend toward more general offerings. Eloquent arguments have been developed to show that the manual training movement and the attendant faculty psychology of the day were more valid attempts to provide for the general education needs of the student than are the offerings of existing programs. Regardless of the validity of this argument, the profession has, throughout its history, attempted to change its program to meet changing conditions in the external world. For example, there has been a general movement away from such courses as forging, welding, sheetmetal, and art metal toward more generalized courses, such as general metals. The same pattern may be identified in the general area of woodworking as well as in the other established instructional areas. In fact, the trend appears to be continuing with the evolution of courses such as construction and mass production. Although noteworthy exceptions are abundant, it seems safe to predict that the majority of these "new" offerings will give primacy to woodworking in construction courses and emphasize metalworking in mass production courses.

The trend toward more general offerings, however, does not alter the basic fact that the instructional scope of these courses is very limited. Courses which have a skills development objective frequently focus on traditional skills rather than em-

phasize the skills associated with contemporary tools and materials. No doubt most teachers are more comfortable working with familiar skill-development activities than when they are confronted with new situations; consequently, there is a tendency to avoid the inclusion of new processes in industrial arts courses. Also, it is difficult to obtain in-service instruction which assists in modernizing courses devoted to the development of skills.

An examination of the projects submitted in the school exhibits accompanying state industrial arts association conventions effectively reveals the primacy of woodworking and drafting. These two programs provide some of the most dramatic examples of current emphases in skills-oriented programs. The students in these courses produce specimens of their artisanship, ready for display and competition. In judging the products of the instructional activities, the professionals in industrial arts education provide overt reinforcement for the emphasis on skills development in industrial arts courses.

Despite the lack of a recent national survey of offerings in industrial arts education, it seems safe to assume that the "general shop" should be added to the list of endangered species. Healthy specimens of this breed are as difficult to locate as are whooping cranes and the California condor. The only refuge for this species which has been located by this writer is in the prairie province of Alberta, Canada. The contrast between traditional general shop offerings and the courses in Alberta schools is roughly comparable to the relationship between the 1814 rockets immortalized in the *Star Spangled Banner* and the rockets used in contemporary manned space explorations.

Several factors have combined to seal the doom of the general shop. The paucity of quality instructional materials has made it quite difficult for the classroom teacher to provide simultaneous instruction in several areas. Few teachers possess the pedagogic competencies, much less the manipulative and technical skills, required to keep a multiple-activity program operating effectively. Consequently, teachers have frequently relied upon simultaneous instruction of the entire class in one of the constituent areas of the general shop. The result resembles serialized units of instruction rather than concurrent investigations across the instructional spectrum.

The consolidation of small rural schools as well as increased enrollments in city schools have resulted in the construction of substantial numbers of industrial arts classrooms during recent years. Since the majority of practitioners were already offering classwide units of instruction rather than simultaneous multiple-activity learning, the new facilities have tended to be laboratories and shops equipped to offer only one of the traditional industrial arts subjects. Thus, recent developments have actually stifled the forty-year-old attempt to make industrial arts course offerings more general in nature. Instead, newer construction practices have reinforced the dominance of programs which concentrate upon the development of skills.

One result of the narrowing of classroom instruction has been the concentration upon the development of skills that are of historical value or the propagation of skills appropriate only in the industrial arts classroom. Dramatic examples exist in almost every area but are most vivid in the firmly established industrial arts content areas. For instance, the skills learned in industrial arts drafting courses are often quite primitive when compared to current drafting room practice. The use of the T-square, triangle, and compass to draw on opaque paper can and does develop dexterity in the manipulation of the instruments. However, when the relative values of the skills are assessed, they fail all tests but that of the school drafting room. Similarly, skills learned in woodworking courses have limited application in the modern world. For several years, this author has asked undergraduate industrial arts teaching majors if they have even seen a scroll saw outside a school environment. Although there are undoubtedly millrooms, custom shops, and model shops where scroll saws are used, none of these students has reported seeing one available for use. As another example, the use of portable circular saws, radial arm saws, and saber saws would appear to be relevant to contemporary activities in woodworking. More often than not, the skill developed is that needed to operate a table saw, frequently to the exclusion of the operation of all other forms of power saws.

The increase in the number of programs with limited instruction in each classroom has given rise to something of a vocabulary crisis. The profession has established elaborate new names for facilities for the narrowed course offerings. The American Council of Industrial Arts Supervisors (1969) defined a unit

shop/laboratory as one in which a single sub-area such as letterpress printing is taught. A limited general shop/laboratory is defined as one in which two or more sub-areas are combined; letterpress, silkscreen, and offset lithography might be grouped and called graphic arts. The American Vocational Association, using the same graphic arts example, calls the new facility a single-field industrial laboratory, “. . . often referred to as a limited general shop.” (1968, p. 21) The United States Office of Education (Schmitt and Taylor, 1968) labels facilities for the more specialized offerings as general unit laboratories. Despite the verbal gymnastics within the profession, the trend toward narrower course offerings has greatly restricted the potential breadth of offerings in the shop or laboratory. This tendency toward laboratory specialization makes it increasingly difficult to develop instruction sequences intended to provide more general knowledge and understandings.

For all the potential weaknesses of the recent developments, there are some important areas of strength in the recent reorganization of courses and content. Improvement is most dramatic in areas without long-term, well-established traditions in industrial arts education. The advent of comprehensive graphic arts programs to replace courses dominated by typesetting and letterpress operation is a dramatic example. The move toward specialized facilities has made it possible for some offerings to become more comprehensive, even if they provide more concentration in an area. The expansion of power courses to include more than the repair of a small gasoline engine is an example. Similarly, electricity/electronics is no longer limited to housewiring exercises and the repair of five-tube radios.

Noteworthy as these innovations are, the emphasis tends to remain on the development of skill across a very restricted range. The project method predominates in most courses which emphasize skill development. The construction of projects is often undertaken despite the availability of superior quality products in local retail stores for far less than the cost of the materials to produce the projects in the industrial arts classroom. The situation is complicated by increasing reluctance on the part of the students; highly prized projects of a few years ago are no longer acceptable. If student reluctance continues, it could force modifications in industrial arts programs which have remained unaffected by major curriculum projects.

### Pre-Vocational Emphasis

Virtually every reader has encountered a situation in which he attempts to describe his job to an acquaintance. Indicating that one prepares future industrial arts teachers often elicits a blank look. Sensing the confusion on the part of the listener, one may simplify his job description to explain that his students will teach "shop" courses in the secondary schools. This usually leads to an "understanding" on the part of the listener and the reaction that "it is just wonderful that you are concerned with helping teach boys a trade that they can use when they leave school."

This generalized reaction from laymen is symptomatic of the confusion generated when specific skills are taught in courses where the instructor justifies his efforts in the name of general education. An equally important source of confusion is the industrial arts/manual training program many adults experienced when they were in school. Earlier offerings were far narrower than the contemporary program. Specific classes such as cabinet-making and sheetmetal, often identified as either manual training or manual arts, are part of the frame of reference of many adults in our society. The same time-lag in the perception of change described at the beginning of this chapter affects laymen as well as teachers. It is unreasonable to expect the public to be aware of contemporary developments in industrial arts education, especially when few efforts have been made to keep all interested citizens informed about new courses and programs.

Despite multiple reasons for confusion regarding the objectives of industrial arts education, there is a substantial and growing number of programs operating under the guidelines derived from clearly formulated pre-vocational objectives. There has been a substantial recent increase in the number of school systems which have moved toward vocational objectives. A favorable outlook for federal funding of programs with vocational emphases is especially important in an era of increasing difficulty in obtaining adequate local support for existing programs. A recent *School Shop* editorial (Prakken, 1971) provides an excellent summary of recent developments.

At this writing, the trends, patterns, and impact on programs for the early adolescent are not well defined. It appears that the impact will be greater for high school offerings than for junior

high school or middle school programs. However, increased funding of all forms of occupational education and the increasing number of school systems adding federally funded vocational programs will unquestionably influence the number of these offerings. The current position of the American Industrial Arts Association (*Monitor*, 1971), which successfully lobbied in Congress to include industrial arts in the provisions of the 1963 Vocational Education Act, could signal an increase in the number of these programs.

The pattern in established pre-vocational programs is remarkably consistent. Junior high schools in school systems with strong vocational offerings at the high school level frequently use the junior high school programs to provide a preview of the potential vocational opportunities in the high school. The specific methodologies used and the breadth of the offerings vary from school to school. In some situations, the junior high school courses are either a general version of the vocational offerings or, in rare cases, the equivalent of the first semester or year of the vocational courses. More often than not, students are introduced to more than one area during one year of instruction. Patterns vary from one semester per subject area to as many as three separate areas per semester.

The instructional methods used in the pre-vocational programs do not vary greatly from the methodologies used in the skills emphasis programs. The major difference is the fact that preference is given to skills and knowledges which will be of direct value in subsequent vocational studies, as opposed to the information and skills which are valuable in everyday life. Thus, this type of program is honest, straightforward, and consequently, readily evaluated. The more precise objectives also make it possible to modify the course offerings where necessary to meet the objectives, a task which is quite difficult when general education objectives are to be achieved via a skills emphasis program.

A frequent and valid criticism of the junior high school pre-vocational offerings is that the preparation is not really for a wide range of occupations, but generally for those occupations represented in the high school vocational education offerings. One response to this criticism has been the development of long-range programs to introduce the learners to occupations. At this

writing, it would appear that research into improved methods for providing all categories of students with occupational information will receive the type of funding emphasis which was devoted to specific curriculum revision in many subject areas during the 1960's. The ultimate impact of these emerging efforts is impossible to predict at present, but a few highly speculative conjectures appear justified on the bases of current trends. First, the quality of the instructional materials will improve as increased amounts of money are available for their preparation. Elementary education specialists and educationists from the general education subject areas will be recruited to aid in the development of a more realistic approach to occupations than the earlier "community helpers" emphasis which had dominated elementary school offerings since the Dewey era. The involvement of professionals who are familiar with early childhood education will improve the occupations instruction which may be expected to begin in early elementary school and continue through the secondary school offerings.

It is almost certain that the occupations instruction of the future will not include "shopwork." If one assumes the widespread acceptance of the occupational offerings, it is uncertain whether industrial arts and homemaking courses will be continued. When one considers the expense of equipping and operating junior high school industrial arts and homemaking programs with vocational guidance objectives in comparison to the probability of federal subsidies for occupations courses, economic factors may encourage radical departures from traditional practice.

### **Leisure-Time Emphasis**

There are many evidences of a rise in the amount of leisure time available to many different groups of people in our country. The advent of the four-day work week is the most recent in a series of adjustments in the work week, resulting in increasingly large blocks of time for activities other than those needed to earn a living. An increasing number of individuals devote a portion of their leisure time to hobbies and other activities that require the manipulation of tools and materials. The remarkable rise in the value of the common stock of the Tandy Corporation during a period of general decline in stock prices is one measure

of the interest in hobby supplies. The proliferation of electronics stores specializing in kits and component sales and oriented toward the electronics buff rather than the service man or technician is another indication of the vitality of hobby activities among the general public.

Two justifications are frequently cited for the inclusion of leisure-time activity in the content of the industrial arts courses for the early adolescent. The first and most prevalent justification stresses the fact that the junior high school is usually the last educational level where industrial arts is required; therefore, provision for the worthwhile utilization of available leisure time must be provided in the educational program at this level. Programs based on this concept consider the leisure-time activities selected for inclusion in the offerings as the course content; that is, the activities are deliberately studied and evaluation criteria are related to the quality of performance of the activities.

A second justification for the inclusion in industrial arts of the hobby-type activity stresses the use of the activities as means to an end. The intrinsic motivation of the activities, readily identifiable as ones which are normally accomplished outside the work environment, is utilized to provide experiences intended to meet other objectives. Thus, the leisure-time activities become part of the methodology, and are relatively unimportant as course content in this second approach.

The specific content of industrial arts programs with hobby-recreational goals varies widely. Regional differences are a major factor—jewelry and lapidary activities are generally more popular in areas where semi-precious stones are readily available than where the stones must be purchased. The usefulness and acceptability of craft objects in the geographic area are also major factors in their inclusion in a crafts program. The acceptance, use, and traditions associated with leather objects in the Southwest are closely related to the prominence accorded leather working in the industrial arts courses there. Regions with a more formal life style, on the other hand, are more likely to stress such crafts as artistic weaving or decorative art metal work.

When regional differences are disregarded, the intended purpose of the offerings is simply to provide the students with instruction in some of the possible leisure-time pursuits. The

objective is simple, clear-cut, and honest. A substantial body of evidence may be gathered to question the extent to which students actually utilize the instruction in their own leisure-time pursuits. However, there can be little argument that the activities are actually those that people pursue during their free time. Evaluation of the offerings thus becomes dependent upon one's philosophical position, and acceptance of the purpose necessitates approval of the outcomes.

A second use of hobby-recreational activities has quite a different objective. The activity is considered a means to an end. For example, the production of fishing and camping equipment has been used as a vehicle to teach an understanding of industry. The utilization of interesting leisure-time activities is not the exclusive domain of newer programs. The high degree of student interest in amateur radio and Citizens Band activities has been used for many years as a mechanism to make the learning of highly abstract electronics principles more interesting and meaningful. Other examples could be listed, but the major point here is that program evaluation must be based on the extent to which students achieve the primary objectives of the program rather than upon their performance of the specific classroom tasks.

Unified arts programs in many of the newly established middle schools frequently take advantage of the motivational potential of leisure-time activities. Since the typical unified arts teaching team is composed of instructors who formerly taught art, homemaking, and industrial arts, there are abundant opportunities to use leisure-time activities to achieve the purposes of the program. For example, invitations may be designed under the leadership of the art specialist and printed under the direction of the industrial arts specialist for a party which is planned and conducted under the guidance of the homemaking specialist. All of the hazards that reduced the effectiveness of the general shop movement and endangered team-teaching applications are inherent in the unified arts program. If team teaching deteriorates into turn teaching ("Today it's your turn") and the unity of the program deteriorates into twelve weeks each of art, homemaking, and industrial arts, the unified arts program will simply become a new name for an old series of programs.

### DEVELOPMENTAL EFFORTS

The sixth decade of the twentieth century has produced educational innovation and change that is without precedent. Industrial arts education has had its share of innovative efforts during the decade. Anyone who has followed the literature is well aware of the developments of the past ten to fifteen years. Books, journals, convention proceedings, conference reports, publications of professional associations, doctoral dissertations, and official reports of the many funded projects have been devoted to the activity in curriculum modification in industrial arts education.

There is little reason to provide yet another examination of the specific features of the various curriculum efforts. Many other publications are devoted specifically to reporting program characteristics. These materials range from precise project reports (Gebhart, 1966; Towers, 1966) to highly readable analyses for the classroom teacher, such as those by Anderson and Olstad (1971), and Peter and others (1969). Summaries of their innovative efforts have been authored by Kirby (1968), Maley (1967), Yoho (1969), and Ziel (1966), among others which could be cited. Thus, while there is a dearth of literature to describe ongoing traditional programs, there is no lack of information on recent innovative proposals.

Many of the reports in the current literature on industrial arts curriculum efforts are concerned with the enumeration of the specific features of individual programs. A few authors have attempted to categorize several programs under general headings for purposes of comparison. The most comprehensive of these has been presented by Cochran (1970), using an organizational strategy first recommended by Swanson (1965). To attempt to repeat the descriptions and categorizations of the innovative programs is unnecessary here. The discussion here focuses upon the probable impact of the innovative programs on the practices in the junior high school and middle school industrial arts programs of the future.

When the definitive features of the individual programs are disregarded and the funding for program development is used as an evaluation variable, the recent curriculum efforts take on a new and remarkably consistent pattern. Using the amount of

funding as a criterion, it is possible to dichotomize the programs for analysis purposes into two categories: programs with major funding, and programs with minor funding.

### **Programs With Major Funding**

The American Industry Project was originally funded by the Ford Foundation, with its later major funding from the United States Office of Education (Face, Flug, and Swanson, 1965). The first curriculum effort with substantial funding, it assembled a significant number of specialists who could give attention to the many facets of curriculum development, field testing, and evaluation.

One year later, the Industrial Arts Curriculum Project, a joint effort of The Ohio State University and the University of Illinois, was funded by the United States Office of Education (Towers and others, 1966). Industrial groups and labor organizations provided supplemental assistance. Again, adequate funding made possible the employment of specialists to perform the major functions of the project. In addition, graduate students were obtained to perform the tedious but highly important tasks involved in library research, the development of evaluation instruments, and the countless other tasks necessary to the success of a major curriculum revision project.

The implications of long-term funding in substantial amounts added a new dimension to curriculum building activities in industrial arts education. For the first time, the availability of ample support made it possible for several professionals to devote their major efforts toward curriculum development. This was in marked contrast to earlier endeavors which were pursued by dedicated individuals who worked on limited budgets, often without significant reduction in their other professional responsibilities.

A major factor in the success of both the American Industry Project and the Industrial Arts Curriculum Project is the careful analysis of the body of knowledge to be taught. This does not imply that both projects came to the same conclusion regarding the content or organization of the body of knowledge. In fact, Cochran (1970) does not even categorize the two projects as deriving their content from the same body of knowledge. The efforts of the two projects to analyze and organize content

for industrial arts has resulted in two carefully constructed models of the universe of content. Even sophomores in industrial arts teacher education curricula refer to the curriculum projects in terms of the "ball of string" and the "pile of blocks," impressionistic reactions to the graphic presentations of the content models.

The efforts that the two projects have directed toward careful analyses of the body of knowledge have also resulted in increased attention to concept development and to the specification of levels of instruction. The concerted analytical efforts have yielded carefully sequenced instructional materials, organized in terms of the hierarchical content models. Deliberate efforts are made to reinforce learning and to aid retention as outcomes of the use of the materials. The touch of professional editors is apparent in the highly readable materials organized to catch the interest of early adolescent learners.

The instructional materials developed by the curriculum projects with substantial funding have been subjected to formal field testing programs. Revisions of the materials to eliminate or minimize identified weaknesses has made the cover-to-cover quality of the final products remarkably uniform. The field tests have utilized a comprehensive national sample of schools. Urban and rural schools have been included, with classes serving affluent neighborhoods as well as disadvantaged groups. Sincere attempts have been made to explore the effectiveness of the instructional materials under most of the conditions in which they are likely to be used.

The net result of the activities of the well-funded curriculum projects is a novel approach to junior high school instruction in industrial arts education. The instructional materials, the purposes stated for the course of instruction, and the actual classroom instruction are carefully designed to replace all elements of the traditional instructional patterns in industrial arts. These funded programs place a high degree of reliance on the instructional sequences presented in their various textbooks and supplemental materials. This should be considered in contrast to the traditional reliance upon the use of tools and machines to process common industrial materials.

The Industrial Arts Curriculum Project and the American Industry Project have been criticized for their "seatwork"

emphasis. Both projects are also frequently accused of discarding the activity orientation which has been the central emphasis of industrial arts throughout its history. The actual fact is that the activities for students bear the same mark of careful, precise, and studied analysis that characterizes the written instructional materials. The scope, content, and ultimate emphasis of the activities in the programs recommended by the two projects are admittedly unlike the activities in traditional industrial arts programs. Nonetheless, the projects propose programs where meaningful activity is an important part of the total instructional approach.

When the numerous individual differences between the two projects with major funding are evaluated, it becomes clear that most of the variation is attributable to relatively minor differences in their definitions and analyses of the contemporary industrial-technical society. However, both projects are *revolutionary* reforms of established practice.

### **Programs With Minor Funding**

The surge of activity in curriculum innovation in the past decade has been facilitated by two major factors. One is the frequently discussed "felt need" of a sizable proportion of the profession. Another important factor has been the availability of monetary support to underwrite curriculum study. Funding of industrial arts curriculum efforts has involved a wide variety of sources, especially in the federal government.

Industrial arts curriculum specialists have made good use of the small grants available through a variety of federal sources. Resourceful use has been made of the Inexperienced Teacher Fellowship and Experienced Teacher Fellowship programs. National Defense Education Act and Education Profession Development Act Institute programs have helped significantly in preparing teachers to implement curriculum change. While these programs were not only sources of funds, they have provided the catalyst for important curriculum efforts by providing support for curriculum innovation at the same time they provided a mechanism for in-service and pre-service teacher education.

The impact of curriculum revision efforts based on relatively small expenditures of outside funds can be seen in statewide influence exerted by programs conducted at Georgia Southern

College and at Gorham State College. These are not the only innovative programs which have had statewide influence despite quite limited funding. They do provide good examples of the strategies used in this type of curriculum revision effort, as well as an indication of the values and limitations of the program with minor funding.

These two efforts began as a result of the dissatisfaction of the respective industrial arts teacher education faculties as they evaluated the then-current trends in industrial arts. This dissatisfaction had been building within the industrial arts profession since the mid-thirties, and reached a peak in the late fifties. To some extent, the lag between current educational practices in the traditional industrial arts areas and contemporary reality reflected the teacher education time lag problem discussed at the beginning of this chapter. More important, however, was the fact that the traditional offerings were not a balanced representation of the skills and knowledges needed to understand and cope with life in the society of the time.

The original impetus for reform and curriculum modification was related to the changes in the emphasis of the undergraduate offerings. While these changes had substantial impact on the graduates of the modified teacher education programs, the majority of practitioners were unaffected. The impact of many early curriculum efforts is candidly summarized by Cochran, who reported: ". . . the departure from tradition was poorly received . . ." (1970, p. 83) The comment was made in relation to the impact of the early work in modifying offerings at Gorham State College, but it applies equally well to the efforts of innovative industrial arts curriculum specialists from coast to coast and border to border. The efforts of the late fifties and early sixties were not destined to fall upon much fertile soil.

Graduates of the revised teacher education patterns gradually generated interest in change on the part of an increasing number of in-service teachers. The task of developing instructional materials to implement emerging concepts was sometimes assumed by graduate seminars. Frequently, though not always, these developmental efforts were assisted by supplemental funding. These funds made it possible to conduct either academic year or summer programs where the program of studies could be tailored to the preparation of teachers and the development of instructional materials.

The ingenuity of the industrial arts teacher educators in maximizing the return on funds is most commendable. Similarly, the creativity of these educators has been evident in the strategies used to develop instructional materials within their groups. Typical of the imaginative use of limited resources has been the work of the Industriology Project (Kirby, 1968). Twelve schools served both as field testing centers and as locations where the fellowship recipients could gain practical experience utilizing their newly-developed curriculum materials.

Individual differences abound among the various programs which received limited funds for industrial arts curriculum development. There has been substantial variation in terms of the exact strategies used to formulate curriculum revisions and to develop instructional materials. It is possible, however, to make some generalizations regarding the nature of the developments and their impact on the industrial arts offerings in the secondary schools of the nation.

The work of the curriculum development projects with minor funding has tended to be evolutionary rather than revolutionary. There are several reasons for their use of evolutionary approaches. First, the primary purpose of the innovators was the improvement of the existent program. Thus, the emphasis was on balanced offerings that attempted to meet the objectives long espoused, but seldom attained, by industrial arts specialists. Second, the innovations had to be attractive to the classroom teacher and not a complete refutation of all that he had been prepared to do and was currently presenting in his classroom. A third factor was the fact that limited funding seldom made it possible for the innovators to devote full time to the curriculum development undertaking. Consequently, they had to rely upon other part-time contributors, frequently graduate students, for the development of materials. Thus, even the best materials produced by the projects with minor funding cannot compare effectively with the polished products produced by the large staffs of the projects with substantial funding.

There are clear differences between the purposes and procedures of the many curriculum efforts which have received limited funding. Their outcomes range from instructional materials to revised industrial arts programs for entire states. There is, however, a common *evolutionary* theme which charac-

terizes their approaches to the improvement of the industrial arts curriculum.

### LOCAL INNOVATIONS

The general level of dissatisfaction with current practices in industrial arts is apparent in the number of schools reporting the implementation of innovative programs. Recent publications, including the major presentations by Cochran (1970) and Brown (1970), are good sources of summaries of local efforts to improve the industrial arts curriculum for early adolescents. The ready availability of these descriptions makes enumeration of the specific details of these programs unjustifiable here.

Local innovations do not arise from a vacuum, but they do not arise without stimulation. The mark of teacher educators is apparent in many products of local innovations. Nevertheless, the local efforts are commendable for their successful adaptations of the recommendations of curriculum specialists. In addition, there are outstanding instances of local professionals demonstrating their leadership ability to generate successful independent curriculum modifications.

Local innovation is inevitable for many reasons. There is a large pool of professional talent working at the local level, often without full opportunity for fulfillment under the existing program. Local innovation has frequently been encouraged by teacher educators and supervisors who are philosophically committed to enhancing, rather than inhibiting, the autonomy of the individual instructor. Thus, many curriculum specialists have deliberately chosen to provide leadership for local innovation rather than to devote their efforts to the preparation of tightly structured instructional programs and materials.

The widespread practice of providing leadership rather than instructional materials is being challenged with increasing frequency. Popham, in a review of curriculum research activities, concluded:

An examination of the curriculum reform movement in this country during the 1960's reveals that, without exception, those curriculum projects which had the most significant effects upon educational practice produced curriculum materials to implement their new curriculum scheme. To state it bluntly, it takes more than admonitions from curriculum seers, even if they are accompanied by polished curriculum guides, to alter the procedures of busy educational practitioners. The educational reformer who

eloquently urges classroom teachers to change their practices may receive the accolades of the educational community, but the educational reformer who provides a set of usable curriculum materials for the teacher is more likely to modify what goes on in the classroom. (1969, p. 319)

Well-executed curriculum modification programs frequently place local supervisors and instructors in a position where they must modify their programs to meet changed regulations and requirements. This is a factor, for instance, whenever a modified program is adopted as the new pattern for a state. Since several of the curriculum efforts already have become the bases either for a state guide or a state regulation, effective implementation is dependent upon how skillfully the local program functionaries can interpret and institute the new programs.

Regardless of the degree of acceptance by the local level personnel, this type of situation can create system-wide dysfunctions and call for extraordinary effort by local school staffs. A dramatic example was observed by this author in the schools of Calgary, Alberta. Provincial regulations had been modified to require a multiple-activities organization of the junior high school industrial arts program. The requirements, patterns of instruction, and the general content were based upon the curriculum research conducted at the University of Alberta (Ziel, 1966; Cochran, 1970). The local supervisor and his staff had the regulations and some examples of materials needed to accomplish the task. Lacking, however, were the sets of instructional packages which included materials needed to conduct day-to-day classes. As a result, the instructors found it necessary to form writing teams and produce the needed software and associated teaching materials. The results were commendable in their quantity and quality, but almost certainly have aspects which digress from the original intent of the provincial supervisor and the curriculum innovators.

Even the curriculum projects which have produced readily available instructional materials complete with guidelines for their use are not insulated from adaptation and modification by classroom teachers. The Industrial Arts Curriculum Project instructional materials (Peter and others, 1969) have a daily schedule, with flexibility planned at the end of the year to compensate for differential learning speeds and variations in school calendars. Disruption of the content unity could create

major problems for both the student and the teacher, since the developers have carefully considered the sequencing of the instructional program. Cost factors and local independence sometimes prevent the local schools from using the total program in its totality; some combination of IACP and local innovation is the natural product.

The American Industry Project materials are also structured, but they do admit a degree of flexibility under highly qualified conditions.

The intent of the program as it is presently published is to provide a workable sequence, but flexible enough so that the individual teacher can make variations in the sequence if he deems it necessary in order to motivate his students more effectively, adapt to his own teaching peculiarities, or take better advantage of community resources. The variations in sequence of lessons would necessarily be planned after the program had been taught at least once using the planned sequence. Evaluation has shown that the planned sequence is effective; therefore, it should be tried before adaptations are made. (Anderson and Olstad, 1971, p. 256)

Regardless of the degree of structured sequences built into the instructional materials, local innovation is inevitable. An illustration of the unanticipated informal local innovation was the subject of a conversation recently overheard by this author. Two teachers, both enrolled in a graduate program, were discussing the problems involved in adopting the materials and approach of the Industrial Arts Curriculum Project in their city. One had participated in the IACP field test; the other had not and was still something of a doubting Thomas. One asked how the teachers handled the relatively large amount of reading required in the program. The second replied that he, too, had been concerned, but it really was not a problem. A solution was readily available: a textbook could be cut into individual pages which were used to produce overhead transparencies. The teacher could then stress the key points of the text material on the projected page image during a class session.

Innovation occurs at the local level for many reasons, including the unique conditions of the school and the community it serves. Some unusual programs are outlined and described in the recently published *Innovative Programs in Industrial Arts* (Brown, 1970). Others are described in the following chapter of this yearbook. Social, ethnic, and economic conditions; migration patterns; educational levels; and industrial influences

will doubtless continue to stimulate local innovations in industrial arts education.

### **PROBLEMS OF ARTICULATION**

Any curriculum encompasses courses at many levels. The interdependence between offerings at the many levels of instruction in contemporary schools often raises problems of effectiveness that can inhibit learning for large numbers of students. Articulation, therefore, is of primary concern both to curriculum specialists and to the classroom teacher. Articulation problems can and do occur in many ways. For example, problems can arise among school levels within a subject area, with other subjects, and within the profession. Any of these areas, or a combination of two or more areas in conflict can cause even the most carefully conceived curriculum to falter.

#### **Problems Among School Levels**

Tradition can create virtually insurmountable problems of articulation. Problems associated with traditional content utilization have already been discussed. Tradition regarding level and type of content can also cause problems. For instance, teachers state that a given topic has "always" been taught in the seventh grade and feel that regardless of what the proposed curriculum pattern may be, the topic should remain at the level.

Administrators and curriculum specialists frequently attempt to facilitate changes in curriculums at the time that new schools are occupied in the hope that the change in environment may facilitate changes in curricular offerings. The middle school movement has been instituted for many and varied reasons. One of the intended outcomes of the new patterns is that the mixture of later elementary school teachers with junior high school teachers will create a combination that can reformulate the program and revitalize educational practices for children during their important transitional years. Unfortunately, the change in environment can, and often does, create rather than solve problems of articulation.

Change in physical location, regardless of prior planning to facilitate change, frequently does not cause any change. Three examples of the variability of change with changed location are available within twenty-five miles of this writer's home. One

new school received national recognition for its architectural innovations that were incorporated to facilitate teaching and learning. To date, the only thing that appears to have changed is the physical facility that the educational programs of the school district use for their pupils. A second new area school has, in fact, changed its program. Instead of relying on ten-inch flat-belt drive engine lathes, they are now using brand new fourteen-inch geared head engine lathes. A third, and slightly older, school in the area has a very conventional physical plant for its industrial arts facilities, but a remarkably innovative program within its walls.

Pride, the handmaiden of tradition, is also a potent factor impinging on effective articulation among school levels. Effective curriculum change that would improve articulation is frequently stifled because of the jealous guarding of content by individuals who are convinced that they are uniquely qualified to teach that content. Perhaps the prescription for course improvement traditionally ascribed to the late Dr. Robert E. Smith of The Ohio State University is appropriate in these instances. If courses only improve when an instructor voluntarily deletes the unit he feels he teaches best from next year's content, it may be that curriculum articulation improves when offerings that are justified on the basis of pride in accomplishment are moved to another instructional level. Such a proposal, of course, is both extreme and foolhardy, but does serve to point out that sound bases for inclusions and sequencing must be based on rational reasoning rather than either tradition or pride.

The third human emotion that creates problems of articulation is that of individual or group bias. Industrial arts teachers in a regional high school that shall remain nameless have informed their junior high school associates that it is the duty of the junior high school industrial arts teachers to "weed out" the incompetent students so that the high school teachers do not have to contend with marginal students in their classes. The obvious implication is that the instructors at the high school level are uniquely qualified to make talented students more talented and that the lowly junior high school instructors should merely serve menial caretaking and screening tasks. Biases are frequently non-rational, if not altogether irrational. The lack of rationality apparent in attitudes and opinions about content

placement, emphasis, and even the desirability of including content makes it difficult to effect change by rational arguments.

Availability of space, design of facilities, and equipment requirements that are tied to school budget considerations are also potent factors mitigating against effective articulation among school levels. Despite the rationale and wisdom of carefully developed curriculum patterns, the financial ability to make the changes must be considered.

### **Problems Between School Subjects**

Articulation among levels of instruction is a vitally important factor in the effective building of a subject matter curriculum. Equally important, although often far more elusive, is effective articulation between subject areas. All of the factors that influenced the problems of articulation among school levels become an even greater problem as problems of professional self-image, differences in vocabulary, and differences in goals work to stifle articulation.

Many units of junior high school industrial arts have direct and important relationships with other school subjects. Many of the materials presented in recently published electricity/electronics textbooks for junior high school age students have the potential to do a better job of teaching mathematics and science principles than do existing science and mathematics books. One likely reason is the activity orientation of industrial arts. The other is that the units on electrochemistry, computers, and other contemporary subjects have frequently been considered too sophisticated for mathematics and science students of this age. Assuming the industrial arts teacher is successful in presenting this content, and further assuming that the science or mathematics teacher considers the content in his realm, potential conflict is an ever-present hazard.

The obvious answer to the problem of articulation across subjects is to plan the offerings jointly. While this is the obvious answer, it disregards the autonomy and independence that teachers traditionally hold dear. Articulation can and does occur. English and industrial arts teachers often work together to produce a school newspaper. Science and industrial arts personnel often work together to produce science fair projects. Speech and industrial arts classes often produce a play in which

the speech students perform on stage and the industrial arts students print signs, programs, and arrange the scenery. These are frequently used examples of articulation. Too often, the goal is not articulation, but exploitation. Articulation implies mutually beneficial activities that reach mutually desirable goals. There are certainly many instances where the examples given are used to unify the programs and provide realism to the content for both courses, but this is not always the case.

Articulation with other subjects is an elusive goal. The less-than-perfect results of unified arts programs indicates the difficulty of articulation. Teachers, despite subject matter specialization, have not been taught how to articulate their offerings with other school subjects. One likely reason is that their distinguished teacher education professors do not have well-developed skills along these lines, either; thus, teachers have neither training nor examples to follow.

### **Problems Within the Industrial Arts Profession**

Articulation within industrial arts is actually a problem with several facets. Articulation among school levels is handicapped by pride, bias, and tradition. Important as vested interests and personal ambitions may be, there are other problems within the profession that make well-articulated programs very difficult to attain. The past twenty years have produced an unequalled boom in the building of new facilities. Farms and woodlots near major metropolitan areas became suburban developments, with large, rapidly-growing populations and the attendant need for new facilities. Cities replaced buildings and added new facilities in an effort to accomodate the influx of children born in the high birth rate years of the 1940's and 1950's. In addition, new programs and offerings in industrial arts were added to many schools. Graphic arts, power, and electricity/electronics facilities were typical examples; all require rather extensive equipment. The result was massive expenditures to house, equip, and operate industrial arts programs in the junior and senior high schools of the nation.

The expenditures and facilities expansions occurred primarily during an era of unquestioned acceptance of traditional offerings and curriculum patterns. Vast sums of money were spent to equip or upgrade facilities. Frequent additions included

completely equipped electricity/electronics facilities with content and equipment based on traditional objectives. Recent changes in goals and objectives leave school systems with large investments in equipment in a very genuine dilemma. Newer conceptions of curriculum in industrial arts make small, mobile equipment highly desirable. The equipment available is frequently of industrial size and quality. Much of this equipment has many years of useful life and was purchased only after elaborate justifications based on traditional skills-oriented objectives. Change, therefore, becomes costly in terms of equipment and facilities adjustments and adaptations as well as in terms of personnel and professional adjustments.

Compounding the factors influencing articulation within the profession is the lack of consensus regarding appropriate objectives, content, and methods. The present indecisive situation facing industrial arts is perhaps the most stimulating era within the history of the profession. Curriculum specialists, supervisors, and teacher educators have found a great deal of stimulation from the ideas competing for ascendance within the profession. Laudable as this trend may be, it is of little consolation to the busy practitioner who must meet several classes each day and provide them with the best materials and instruction available.

### **NEED FOR A NATIONAL UNITY OF PURPOSE**

Many social, economic, and legal factors have arisen in the recent past that bring into question the validity of local control over education. The much-heralded rise in urbanization appears to be turning into a rise in suburbanization. Nevertheless, there is a definite movement away from rural areas toward urban centers. In those regions where agriculture remains a dominant factor, school consolidations have increased the size and consequently reduced the number of schools, again creating relocation problems. The rise, and sometimes the decline, of major industries frequently causes wholesale changes in school attendance patterns. White collar job transfers are an accepted part of the tribulations needed to achieve success within the major corporations of the nation. The concentration of skilled craftsmen assembled in several locations around the country in the peak years of the space effort demonstrates dramatically the fact

that many occupational groups in this nation are highly mobile. Other evidences of mobility, such as the proliferation of firms renting trailers, trucks, and moving accessories, give firm indication of the present state of mobility of the nation's population.

Economic factors of mobility are established factors that must be considered when evaluating the educational offerings of any school. A more recent factor that demands careful assessment in determining educational policy is the court-ordered racial balancing of schools. Legal decisions ordering balancing of local districts are increasingly used in an attempt to equalize educational opportunity. In a case still in litigation at this writing, a judgment is sought which would require the balancing of not only local districts, but of several adjacent districts not involved in the original suit. Should this type of precedent withstand continued legal tests, the need for a general unity of purpose in all schools will become increasingly important.

A unity of purpose simply does not exist. If there were a unity of purpose, either explicit or implied, there would be no reason to discuss the condition in this chapter. There are many visible factors that have mitigated against the establishment of unity of offerings at any level of instruction, in any region, or for any subject area. The most visible and probably the most potent factor preventing unity of program offerings is the jealously guarded concept of local autonomy in curriculum matters. Fear of "losing something" on the one hand, and pride in the ability to determine and meet the needs of young learners better than any other school district has helped to perpetuate the concept of local control. Since local property taxes provide most of the funds needed to operate local schools, there is little chance of outside control over funds to enforce unified programs. Increasing reliance on non-local funds may provide the measure of control necessary to overcome history and tradition.

Closely related to the concept of local autonomy is the concept of individual teacher autonomy. Increasing concern for articulation within the schools is likely to reduce the willingness of administrators to give individual teachers virtual control over their content and the relative emphasis of units within their courses of study. Economics will probably overcome tradition in the case of instructor autonomy when accountability for funds from external sources becomes a factor.

A more subtle factor that has impeded unified programs is the lack of consensus within the industrial arts profession. The oft-cited failure of the American Industrial Arts Association to publish a list of objectives for industrial arts is symptomatic of the lack of consensus within the profession. Little can be said about contemporary programs other than the fact that they are still dominated by woodworking, drafting, and general industrial arts (whatever that is) just as they were when Schmitt and Pelley (1966) conducted their survey ten years ago. The extent of this domination is unquestionably on the wane, but it is still a major factor.

Adherence to traditional objectives and instructional patterns becomes all the more understandable when one looks at the disparate points of view between the various local, state, and national professional associations that serve industrial arts. Regional patterns within state associations are also apparent. Even the casual observer can detect lack of unity when one compares the outlook and activities in programs from rural regions with the occupation-emulating experiences which populate programs in urban centers.

A great deal of the failure to attain a sense of unity has been the responsibility of industrial arts teacher educators. There is much to be said for healthy competition between competing points of view. Innovation and change occur when opposing points of view are presented for all to evaluate, criticize, and modify. Publication and explanation of divergent points of view is a means to unity, not to disunity. Competing points of view that are widely circulated permit all to evaluate the published position and their own position.

The lack of communication between teacher educators is quite apparent in the lack of publication of the outcomes of recent academic year and summer institute programs. Many of these programs produced genuinely useful curriculum materials and innovations. The availability of these is, for all practical purposes, limited to those involved and those who knew of the undertaking and were able to secure materials through informal means. Admittedly, the budgets of these workshops and institutes did not permit extensive publication and distribution of materials. There are, however, well-established publication outlets for the profession that could have been used. Instead, each

institution continues to work in isolation, frequently at cross purposes with sister institutions.

There are indications that a semblance of unity is beginning to appear. Current conditions within the industrial arts teaching profession are similar to the conditions among contemporary religions. There are clear-cut indications that joint efforts and collective action are vital if organized religion is to continue to serve the people. The fragmentation and duplication of efforts within charity, welfare, and social action efforts of individual religious groups has weakened their impact. Similarly, there are in many cases only slight doctrinal differences between various sects. The need for a unity of purpose is clear. Thus the contemporary ecumenical movement. Ecumenical problems are not related to the discussion or justification of a need for unity; rather, they are problems of how to achieve the unity. Sacrifice and compromise of individual attitudes and values are necessary to achieve a unity of purpose. There are some faint glimmers that these goals are being reached, although it is safe to predict that there will be obstacles that will not easily be removed.

The acceptance by classroom teachers of the many innovative proposals is a measure of the desire of the first-line practitioner to change toward a modified outlook. There is growing consensus that the imparting of traditional skills through traditional graded manipulative activities is being perceived as unimportant by the youth of today and by their teachers. No known definitive study of the extent of this dissatisfaction is available, but the evidence of dissatisfaction is everywhere.

The dissatisfaction with traditional content and method has manifested itself in increasing acceptance of programs that use as their content base life in a complex industrial-technical society. The majority of the recent innovative programs are attempts to integrate this type of content into the traditional activity-oriented industrial arts programs. Unity of offerings is far from an accomplished fact, and there are many problems of articulation; but evaluation of these patterns leads to the inescapable conclusion that there are the beginnings of a trend toward unity around cultural understandings and goals.

Teacher educators are also beginning to utilize resources and opportunities available to them to increase unity and provide a forum for discussion. The increasing use of regional,

and usually informally structured, teacher educator conferences has great potential to aid in achieving a unity of purpose. Open discussion, presentation of competing points of view, and evaluation of current issues in the conference setting can and do identify points of common concern and possibilities of unity of purpose. The record of achievement of the regional conferences of industrial arts teacher educators is largely a record of missed opportunities; nevertheless, such in-service sessions have the potential of providing great service to the entire profession.

Teacher educator tenure without requirements for in-service development is a factor that must be considered in the development of a unity of purpose emanating from within teacher education. If Lucy and Charlie Brown can lament their inability to perform new math when they possess old math minds, then it appears that there may be lamentable problems of changing cherry nightstand and sugar scoop teacher educators into specialists in the interpretation of contemporary industry.

Unity of purpose is likely to occur for the oldest of reasons for unified action. Fear of encroachment is a very real problem for the industrial arts profession. There are very real threats to its very existence as a result of subtle changes in the policies regarding federal subsidization of local level programs. There appears to be interest in financing only those programs that have the overt purpose of providing guidance toward, and instruction in, programs leading to employability. Industrial arts is not the only area being directly influenced by this change in policy, but it is one that has a great deal to lose should the change actually occur. The current state of disorganization and lack of unified purpose within industrial arts is likely to cause serious questioning regarding its value, use, and purpose. Should this occur, and should funds for education at all levels become increasingly difficult to obtain, the ready availability of funds for occupationally-oriented programs will leave administrators with few alternatives. The threat of losing both the traditional general education goal (regardless of how irrational the methods used to achieve this goal) is very real indeed. Several years ago, Karnes (1959) published an impassioned plea to improve or perish. The need to improve and develop a sense of unity has never been more important than it is today.

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## Case Studies

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Throughout this volume, emphasis has been placed upon the importance of teachers and supervisors in the process of curriculum innovation. The point of view has been presented that the improvement of industrial arts offerings for early adolescents requires the commitment and involvement of professional personnel at the local level. While this may seem to belabor the obvious, it is clear that the schools need not wait for outside stimulation and support. Sources of existing vitality in the local professional group can provide the necessary moving force for significant improvement in an industrial arts program for early adolescents.

This chapter presents a series of reports of locally-sponsored innovations in industrial arts programs for students in one or more of the grades, six through nine. Selection of schools for inclusion was based upon the recommendations of knowledgeable professionals, citations in the professional literature, and upon the availability of the programs for observation at times which could be scheduled by the editor. The group of programs included here is illustrative rather than exhaustive. It has been physically impossible to obtain equal representation of all geographic areas. Many exemplary programs could not be included; it is hoped that the professionals guiding those efforts will accept the editor's apologies for his inability to provide more inclusive coverage of the many exciting developments in industrial arts.

The examples selected for inclusion provide an indication of the potential for curriculum development which exists in large

city school systems and in schools which have only one industrial arts teacher. Rural, urban, and suburban settings are represented. The several types of developmental efforts provide a variety of experiences for learners in grades six through nine. In general, schools which were closely affiliated with major industrial arts curriculum projects have not been included. Rather, the focus has been upon local school systems which have implemented significant curriculum improvements, particularly those which have successfully synthesized the recommendations of two or more curriculum projects.

With only one exception, the editor has visited each of the programs personally in the preparation of these reports; this in itself has been a rewarding experience. The single exception, Edmonton, Alberta, is described in the excellent report by LeBlanc, Shykora, and Day. In most cases, it was possible to visit classes in session, interview teachers, and to obtain a perspective of the school setting. A preliminary draft of the report was submitted to the professionals in the local situation for their modifications, corrections, and suggestions prior to publication.

An attempt has been made to identify major points of interest in each local situation and to describe them in sufficient detail for the reader to comprehend them and evaluate them for his own purposes. The specific innovations are placed in some perspective by a brief description of the community setting, the school system, and the industrial arts program in the school.

The editor wishes to express his deep appreciation to the many teachers, supervisors, principals, and superintendents who permitted this glimpse into their activities. To them and to their innovative colleagues who could not be included goes a hearty professional salute for a job well done.

## IMPLEMENTATION OF THE SYSTEMS APPROACH IN THE EDMONTON SCHOOL SYSTEMS

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Edmonton, the provincial capital, has a metropolitan population of approximately 465,000 and is located in the central portion of Alberta, Canada. During its early history, it served as the outfitting point for miners heading for the Klondike gold fields. Today, Edmonton is a cosmopolitan, industrialized center, with cultural activities which include live theater, ballet, and symphony presentations. Professional football, hockey, and baseball also thrive. As an intellectual center, Edmonton is the home of the University of Alberta, the Northern Alberta Institute of Technology, Adult Vocational Center, and two community colleges. The building of a second university, Athabasca University, is scheduled for the near future. With the recent completion of the Yellowhead Route, a highway linking Edmonton with Canadian Pacific coast seaports, the city's position as the hub of regional economic activity has been strengthened.

The Provincial Department of Industrial Education is responsible for providing direction and guidance to the industrial arts and vocational education programs in the schools of the province. In 1970, the Department was responsible for a total of 412 teachers who taught in 383 laboratories. The philosophy espoused by the Provincial Department provides guidelines for all schools in the Province. The Provincial Department also provides course guides, workbooks, newsletters, equipment lists, and resource bibliographies to assist teachers in their activities. Although the new philosophy is province-wide, this study will be concerned with the new program as it has influenced the schools of the city of Edmonton.

Edmonton is served by two school systems: the Public School System and the Separate School System (Catholic). Both systems are partially supported by the Provincial Government. Funds are appropriated through a provincial foundation program; each taxpayer indicates which school system is to receive his tax monies. Additional local appropriations are based on the number of students served by each system.

Prior to the reorganization described here, the Public System operated a rather traditional industrial arts program which had begun as manual training in the early part of the century. The Separate System had not included industrial arts as a part of its curriculum until the early 1960's, although a few small shops (woods and metal) had started in 1950. The two school systems in Edmonton, therefore, provide an interesting contrast in the problems encountered while implementing new curriculum ideas in industrial arts.

The industrial arts program in the Public System was based on a unit shop approach to teaching, with most courses designed to provide instruction in a sequence of two or three areas each year. Auto mechanics, metals, woods, electricity, and drafting were typical shop activities in grades seven, eight, and nine. In some instances, general shops were utilized to teach two or more areas concurrently. Prior to 1965, the senior high school students either pursued an academic program or went to a vocational high school; industrial arts did not play an important role in the curriculum at that level.

Teacher education was a major factor in the industrial arts curriculum developments in Edmonton and throughout Alberta. In 1962, the University of Alberta Department of Industrial and Vocational Education was established under the direction of H. R. Ziel. This Department was assigned the responsibility for preparing industrial arts teachers for the school systems of the Province. Prior to that time, the Southern Alberta Institute of Technology had provided teacher education programs in addition to their primary responsibilities in technical education; this program was phased out in 1966. As a first step in the relocation of the teacher education function, experimental laboratories were provided in an Edmonton junior high school. Later, the laboratory courses were provided on the campus of the Northern Alberta Institute of Technology. By 1967, teacher education laboratory

facilities were centralized on the University of Alberta campus, with supplementary research laboratories in the local schools.

In November, 1963, the Provincial Department of Education established an Advisory Subcommittee to study changes in the junior high school industrial arts curriculum. Representation on this committee included teachers, supervisors, principals, teacher educators, and Department of Education personnel. The group was charged with the task of developing a philosophy more in accordance with that advocated by the University of Alberta and then proposing ways of implementing the changes this required. After approvals by the Provincial Department of Education, the new program was introduced to the Province in May, 1964, as a recognized alternative to the existing program of industrial arts.

During the 1964-1965 academic year, additional preparatory work was performed and the necessary approvals were obtained to begin widespread implementation of the new program. Guidelines for program operation were prepared and disseminated to the schools. The Provincial Supervisor of Industrial Arts met with superintendents and school boards to discuss policies, guidelines, and procedures for the new program. The Department of Education implemented the new program in 55 Alberta schools in the fall of 1965.

Close cooperation was maintained between personnel of the University of Alberta Department of Industrial and Vocational Education and the Province Department of Education at all stages of implementation, including the establishment of objectives, program development, program inauguration, and the planning of facilities. Provincial funds provided a grant of \$4.00 per square foot for equipment and up to \$17.50 per square foot for the construction of the industrial arts facility. Any additional monies which were required came out of the local funds. Sizes were 3000 square feet (one-teacher laboratory), 4800 square feet (two-teacher laboratory), 7200 square feet (three-teacher laboratory), and 9600 square feet (four-teacher laboratory).

The overall objective of the new industrial arts program is the development of an informed citizenry in a highly industrialized society—a society which must learn to use and control the technologies. The school is considered to have the responsibility of preparing students to live in an industrial complex unknown before and to work in vocations not yet described. Within these

broad parameters, the following objectives have been established by the Alberta Department of Education (1969) :

1. To provide exploratory experiences in various technologies prevalent in a productive society.
2. To provide a synthesizing environment for students to apply their knowledge in the solution of practical problems.
3. To provide a supplementary guidance function by introducing the students to the multiplicity of interrelationships of educational and occupational opportunities.
4. To provide an environment which stimulates individuals to discover and develop their interests and talents.
5. To develop attitudes of safety with respect for safe working habits and practices in the use of tools, equipment, and materials.
6. To develop attitudes of personal and social responsibility.
7. To have students develop an organized conceptual frame of reference interrelating the knowledge of various technologies prevalent in a productive society .

The discussion now turns to an examination of the activities of the two school systems as they implemented the new industrial arts program. While each of the local systems, Edmonton Public Schools and Edmonton Separate Schools, worked within the framework for the Province of Alberta as outlined above, each system had unique characteristics which led to the utilization of different methods for implementing the innovative curriculum. Therefore, each school system is presented separately.

### **Separate School System**

The city Separate School System included 1530 teachers in 1970. Twenty-six were industrial arts teachers, teaching in 26 different laboratories. Basically, the program is as outlined by Harder (1968). It is available to boys and girls of all achievement levels. A multiple-activity environment is used to provide classroom-laboratory instruction in four or more activities simultaneously.

In the eighth-grade program, students study woods, plastics, earths, metals, and visual communications. In the area of plastics, for example, student activities include PVC welding, fiberglass layup, casting, forming, and molding processes. The students also study plastics finishing processes and certain testing techniques, such as the use of the polariscope to study stresses of plastics under pressure. Throughout this course, an attempt is made to assist each student in the identification of his interests

and talents. Emphasis is placed upon the application of information acquired in academic courses and upon problem-solving processes in the industrial arts laboratory setting.

The ninth-grade program explores the areas of technology: graphic communications, electronics technology, computer technology, and power technology. In addition, a unit in developmental research provides students with an opportunity to research new fields of interest to them—aerospace and rocketry are two such fields. Representative learning activities in the course include modern graphic reproduction methods, radio, engine systems, pneumatics, materials testing, and computer applications. Attention is also given to manufacturing plant problems, such as pollution control.

The senior high school program is based on twenty-one units of study, including electricity-electronics, woods, metals, plastics, earths, textiles, drafting, photography, printing processes, hydraulics, and pneumatics. A high school student may specialize in one related area to obtain vocational preparation during his three high school years. For instance, a student who selects power technology studies internal combustion engines, electrical sources, hydraulics, pneumatics, electrical transmission, mechanical principles, and units on other power sources. On the other hand, a student seeking to obtain additional general educational experiences at the high school level selects one area per year from among electronics, materials, graphic communications, and power technology. Each year the industrial arts student studies in a different area.

An industrial arts course called "industrial science" is available to students in grades eleven and twelve. This course seeks to build an understanding of human roles in the industrial organization structure, the interplay of pressures between man and technology in the production of goods and services, and the relationships between human factors and corporate success or failure. In addition, the course exposes the student to the mechanics of industrial organization and the interrelationships among the various areas of technology. Specific learning activities are devoted to decision making, communications, organizational structures, and the functions of management and organized labor in the industrial enterprise. Each class organizes its own company and designs its own products to manufacture. Monies collected from

the sale of the product help cover the cost of materials and may offer a small return in the form of dividends to the shareholder.

Industrial arts teachers were assisted in implementing the new industrial arts program in the Separate School System through a series of instructional materials. Of special interest to the present discussion were IMPAK (Instructional Materials Package Audio Keyed) and SPI (Sequenced Program Instruction). In developing IMPAK, teams of teachers determined priority areas, wrote scripts, prepared tape recordings and filmstrips, and provided charts, pictures, and tests to complete the package. The SPI series dealt primarily with a variety of industrial processes. In addition to IMPAK and SPI materials, teams of teachers produced safety manuals, resource material lists, and guides to instruction in new subject areas. Following field testing and approval, the materials were made available to the Provincial Industrial Arts and Vocational Education Council for dissemination.

Leadership by the School Board was also provided in working to obtain industrial equipment appropriate for school use, in designing and modifying facilities to provide appropriate laboratories for the multiple-activity approach, and in direct assistance in the improvement of classroom teaching effectiveness. Video tape recordings were utilized to demonstrate effective ways to organize and begin a class using the multiple-activity system. Also, individual teachers had access to video taping equipment, if they wished to use it, to evaluate their teaching effectiveness. This was done in conjunction with a confidential critique by their supervisor. Video tape recordings were also prepared to portray industrial procedures and relate them to activities in the industrial arts laboratory.

### **Public School System**

Industrial arts was first introduced in the Public School System as manual training in 1906. During the early years of the program, one teacher traveled from school to school, providing instruction in drafting and woodwork. Metalworking was added to the curriculum after World War I, and electricity was added after World War II. This "four-year" program existed until the early 1960's, at which time the University of Alberta started the new program.

Following the recommendation of the Department of Education, the Public School System commenced the upgrading of equipment and furniture in 1965. The process was undertaken to provide for the new industrial arts program. During the following five-year period, new curriculum areas were added and equipment was upgraded in the existing laboratories.

However, a number of problems forced the Public System to innovate at a slower pace than that achieved by the Separate System. Existing facilities tended to restrict the flexibility of the schools in moving toward the new program. Laboratories had to be remodeled, rebuilt, or enlarged. The costs of change-over had to come from the current expenditures of the local school board, for no grants were made available for upgrading. Consequently, in many cases, it was necessary to implement change within the restrictions imposed by an existing laboratory until funds were made available to permit the construction of a new physical plant.

Generally, conversion to the new program was accomplished by introducing one area or unit of study, in as many laboratories as funds would permit, each year. For instance, plastics instruction was incorporated into the program one year; and the following year, power technology was introduced. This procedure permitted teachers to implement something new in their laboratories each year without forcing them into an impossibly complicated reorganization of all of their programs at one time.

It would serve little purpose to elaborate on the industrial arts curriculum offerings of the public system, for essentially they are the same as those enumerated for the Separate School System. The Public System has adopted the same philosophy. The laboratories are organized in a number of different sections representing the units of study: woods, metals, plastics, earths (ceramics), electricity-electronics-computer, power, visual and graphic communications, leather, lapidary, and developmental research. Since this program is a multiple-activity program, each student at the junior high school level takes at least three different units each year if he is in a three-year program (grades seven, eight, and nine). If in a two-year program (grades eight and nine), at least four different units are studied each year. The number of years a student is exposed to industrial arts and

the number of units taken during these years are dependent upon accommodations in the laboratory facility.

Implementing the new program was a major task for both school boards, since teaching graduates who had taken the new program at the University of Alberta were not available until 1968. During the initial years, workshops and seminars were provided for teachers to become familiar with the new philosophy and to acquaint them with the use of equipment. In-service sessions for teachers were sponsored by the school board, industries, the Department of Education, and the Industrial Arts and Vocational Education Specialist Council of the Alberta Teachers' Association.

### **Implementation Problems**

With the inauguration of any new idea, there is some resistance to changes which occur, so it is not surprising that this was the case in Edmonton. Some problems were directly related to limitations in physical facilities: old, poorly designed and equipped laboratories; inadequate equipment; and unavailable utilities. Capital expenditures were difficult to obtain; consequently, adoption of the new program was delayed for lack of equipment. Industrial cooperation had to be obtained to design new, less expensive equipment of many types for the laboratories. Industrial personnel also had to be obtained for in-service teacher workshops. There were initial problems due to lack of instructional materials, but these were alleviated to a degree with the publication of student manuals written by Alberta teachers and a Department of Education newsletter for teachers.

In essence, teachers of the two Edmonton school systems faced four alternatives as the new program was phased into operation: (1) return to the university for summer courses to develop competencies needed to teach the new program; (2) individual professional up-grading through reading and experimentation; (3) remain in existing laboratory facilities until they were eventually phased out; or (4) retirement. In the final analysis, teacher response to the challenge was encouraging. Many teachers returned to the university for retraining; even larger numbers effectively participated in the in-service workshops.

Newly prepared teachers from the University of Alberta quickly served as the nucleus of the professional staff, working

on instructional materials during the summer following their graduation, then remaining in Edmonton to begin their teaching careers in the fall. A limited number of \$1000 bursaries were made available by the school systems to fourth-year industrial arts teacher education students at the University of Alberta, with the intent of retaining their services as teachers upon graduation.

In unity there is strength—this is the major reason for the success of industrial arts, thus far, in Edmonton. There has been and continues to be close cooperation between the two school systems, combining resources to solve common problems. Industrial arts supervisors communicate with the purpose of keeping each other informed of their activities. Thus, if the Public School System is expending efforts in a certain direction, for example, development of instructional materials for plastics, then the Separate School System will concentrate efforts in another area. Once results are obtained by one school board, they are made available for use in the other school system. School systems also use a team approach for developing materials. Teachers from both systems form a committee to solve a particular problem. An example of this type of cooperation was the pilot project on Production Science. This was an effort to introduce industrial sociology and psychology into the industrial arts program. As a result of this combined effort, a course outline for Production Science was developed and presented to the Department of Education for approval.

As is the case with other school systems which wish to keep abreast of change, the Edmonton school systems found it necessary to conduct a wide variety of in-service teacher workshops. Cooperation was again evident, for workshops were conducted for the benefit of teachers in both systems. For example, if a person conducted a workshop for the Public School System, teachers in the Separate System could also benefit from the endeavor.

Although many problems have been solved, Alberta educators realize that the challenges of change will present new ones which must be solved if a viable educational system is to continue.

## Evaluation

There is relatively little concrete evidence on the effectiveness of the program. However, the present Supervisor of Industrial Arts, A. A. Day, indicates that the multiple-activity organizational pattern has increased student interest and that super-

intendents, principals, and teachers enthusiastically support the new program. In addition, Day reports that the multiple-activity laboratories are less expensive to equip and operate than the more specialized unit laboratories typically utilized in more vocationally-oriented programs.

LeBlanc (1968) used his Awareness of Alberta Industry Test to assess the achievement of boys and girls in the new program against the achievement of boys and girls in the "old" industrial arts program (woods, metals, and some drafting) and in home economics. The new program did yield higher achievement for the total group of eighth and ninth grade students. Subgroup analysis indicated that the differences favoring the experimental treatment groups were significantly higher than the comparison groups for grade eight, but that the treatment groups did not differ significantly at the ninth-grade level. Manuel (1968) compared the achievement of ninth-grade girls who had taken the new industrial arts program with the achievement of a similar group of girls who had not taken industrial arts. The Provincial Department of Education examination results were used for analysis purposes. Items on the examination, which tested the three highest levels of the cognitive domain (analysis, synthesis, and evaluation), were answered significantly more often by the girls who had the industrial arts program than those who were not enrolled in the industrial arts program.

### Summary

Since the inauguration of a new philosophy of industrial arts at the University of Alberta in 1962, the two school systems in Edmonton have made tremendous progress in implementing the new program. Both school systems essentially follow the new program, as they are part of a centralized provincial educational system which has adopted the new philosophy. As a relatively newer school system, the Separate System generally implemented the new program as new facilities were constructed. On the other hand, the Public System made slower progress since a large number of existing laboratories had to be converted. Renovations in the Public System's schools required that monies from current expenditures be used, for grants were to be used for the construction of new laboratories. It was from this source that much of the resistance to the new program came. With the limitations of old physical facilities, poorly designed and equipped labs, lack

of funds and lack of assistance, teachers had difficulty coping with the new philosophy during initial stages. However, school boards, through the use of bursaries, the help of industry, educational organizations, and institutions, provided opportunities for teachers to gain competency in teaching the new program. Within the limitations, the larger Public System found it feasible to implement the new program one area at a time.

Both school boards realize that although great strides have been made, there is still much to do. But if past performance is a valid indicator of future success, then the challenges of future educational decisions will be met, as were the complex problems of initiating a new program but a few brief years ago.

### LINE PRODUCTION IN GRADE SIX

Hesston, Kansas, is a town of 1500, located approximately 35 north of Wichita in an area of family farms. The town itself has a strong industrial base: Hesston Manufacturing, the tenth largest farm equipment manufacturer, employs about 1000 people producing loose hay handling equipment, loaders, cotton pickers, and potato diggers. In addition, a furniture manufacturing firm, a plant producing tractor and combine cabs, and a large bridge construction contractor are located in Hesston. The manufacturing firms draw heavily upon the area's family farmers, many of them Mennonites, to obtain the necessary labor force.

Hesston public schools enroll approximately 730 students in all grades. Grades nine through twelve enroll about 230 students; approximately 240 are in grades five through eight. The school district, covering about 60 square miles, has a population of approximately 3500. Six colleges are located within 50 miles of Hesston. Each year, approximately eighty per cent of the sixty or so high school graduates go on to college.

Boys and girls in the sixth grade in Hesston are enrolled in a nine-week experience in industrial arts which is described in detail later in this report. Seventh and eighth grade boys take courses in construction and manufacturing, respectively. These courses are based upon the detailed outlines, instructional materials, and activities developed by the Industrial Arts Curriculum Project.

Students in grades nine through twelve may elect a course in general industrial education. This course covers three areas: (1) material technology, including wood, metal, and plastics; (2) graphic communications, involving drafting, printing, and photography; and (3) power technology, which consists of power mechanics, electricity/electronics, and hydraulics and pneumatics. Each of the nine 20-hour units in this course has been developed around behavioral objectives prepared by the instructional team.

Individuals who have completed the general industrial arts course may elect additional industrial arts work. One of the three instructional areas is selected for further exploration, first in eighteen weeks of in-depth study, then on an independent study

basis under a contract with one of the instructors. A cooperative work experience program is also available to students in grade twelve.

Students in grades eleven and twelve may serve as student assistants, working with grade levels six through twelve. These advanced students enroll in one hour of independent study and spend an additional period working with one of the classes of younger students.

During the three periods in which industrial arts is available to the senior high school students, individuals in grades nine through twelve may be scheduled for classes. The three teachers work together as a team, with each teacher responsible for one of the three instructional areas which make up the ninth-grade course and the subsequent specialized study and independent investigations. Thus, each teacher has primary responsibility for a group of students from four grade levels who are working in three areas in the laboratory. As independent study projects proceed, students frequently reach across the boundaries between areas to utilize the expertise of more than one teacher.

In many ways, the breakthrough for industrial arts curriculum development in Hesston was an unexpected by-product of a setback in the planned building program. As the community planned a new building to house the senior high school, an unusual floor plan evolved, utilizing hexagonal units. The space available for industrial arts was inadequate for traditional, self-contained laboratories with concentration upon content areas. Funds were not available for the expensive, specialized equipment which characterizes many senior high school facilities. Consequently, it was necessary to design a compact, flexible facility within the design constraints imposed by the hexagonal layout. The Hesston Citizen's Industrial Education Committee and the staff of Hesston High School were assisted by Ed Webb of Wichita State University and by the participants in the 1968 NDEA Institute at the University of North Dakota under the direction of A. E. Rudisill as the facilities were planned for the new building. A broad range of student activities can be effectively accommodated in the long, continuously open space. The centralized office area with adjacent classroom and individual study areas simplifies supervision and facilitates integrated planning among the teaching team.

The most noteworthy development in the industrial arts program at Hesston is the sixth grade program, which provides nine weeks of production activities as the primary orientation to industrial arts as the study of industry. A regular classroom-sized group of 25 to 30 students, both girls and boys, works with a two-teacher team: George Arnold and Orie Davis. These men, working with the coordinator of industrial education, Ronald Zielke, have developed an approach which provides active participation in the production processes. While some time is required for such peripheral activities as the sale of stock, product design, production engineering, market research, and sales, the primary emphasis in the program is upon the manufacturing of a product.

Each class begins its transition into a production company by electing a president. The newly-elected president conducts an election for members of the board of directors. During the period while market surveys are being conducted to estimate the demand for the product, students apply for the various jobs which are available in the production sequence. Students are interviewed by members of the board of directors. Prospective workers may be required to demonstrate their competence for jobs demanding skilled performance. Students who wish to apply for jobs requiring them to operate power equipment first obtain individual instruction from the teachers and pass a test on the safe operation of the item; satisfactory completion of the test is required before individuals may be placed on the machine operators' jobs.

Preparatory work in designing a product or selecting an item to be produced is completed by the teaching team before the class begins. Production planning, scheduling, tooling, and other details of production must be handled by the teachers. While the learners may be able to grasp the concepts involved, they do not have the background skills and knowledges necessary to do the preliminary processes efficiently.

A market survey, conducted by the students at a booth set up in the downtown area, provides information on consumer preferences for materials, designs, and finishes. Time, space, and expense factors, as well as the outcome of the market survey, are used to determine the size of the production run. The number of items to be produced and the per unit cost of materials establish the necessary capitalization at twenty-five cents per share. Once costs and production have been established, the retail price is set to provide for a forty per cent mark-up over cost.

The first sixth-grade class to attempt the production experience sold 500 shares of stock at twenty-five cents per share to capitalize their company to manufacture note pad holders. The company produced 144 items which sold for \$1.25 each. Within one month, the shareholders earned over forty per cent profit on their twenty-five-cent shares. Several of the junior capitalists were so impressed by their success that they have attempted to buy stock in later companies. Students are permitted and even encouraged to sell stock to other students, parents, and teachers.

Each company has established a checking account in a local bank, which has supplied free checks imprinted with the company's name. The checking account enables the student corporation to purchase supplies from local sources and to reimburse the school's activity fund for materials used from inventory. When the production run is completed, all products sold, and all expenses paid, the profits are divided among the stockholders. The company is then liquidated by issuing checks to all stockholders for their original investments plus their share of the profit.

The first production run with sixth-grade students brought some pleasantly surprising outcomes. The students were quite effective in operating the power tools—circular saw, jointer, belt sander, and disc sander—all of which had been carefully prepared with self-guarding tooling. The girls worked especially well, though their hair, in the currently popular long styles, presented some hazards around the power tools. The group tended to become perfectionistic at times. Nevertheless, they frequently attained a production rate of nearly one note pad holder per minute with few rejects.

A special schedule was arranged to permit a longer class period on the days the production line ran. Midway through the period, a "coffee break" provided soft drinks and cookies for all workers at company expense.

The product required basic cutting, smoothing, assembly, and dip finishing operations on the wooden base, as well as padding the note sheets and attaching the pad to the base. Packaging was accomplished by vacuum forming a plastic sheet to conform to the shape of the note pad holder, then stapling the plastic to a cardboard backing sheet. Separate lines were run for production and for packaging.

Students in the first group prepared a video-taped commercial advertising their product; it was never used because sales

exceeded expectations and quickly reached production capacity, selling out within six days. The next group to go through the experience produced desk caddies, an item expected to have a high demand, so they built 250 units to sell at \$1.85 each. Their plans to set up a display in a shopping center for the sale of the product were also stymied by the fact that all items were sold before they could implement their sales display.

The classes have invited their parents to visit the school and observe their activities. Parents came during the day to watch the production line in operation during the first class. The second group thought it would increase parental participation if they ran the production line in the evening for their parents. Their predictions were fulfilled; parents of twenty-four of the twenty-six children appeared for the evening session. The parents watched their children run the line, then the students "taught" the adults to do their jobs on the line. Finally, the parents operated the line under the close supervision of the children. Good-natured jesting accompanied the inevitable hold-ups along the line.

A Wichita television station considered the innovative approach newsworthy. An on-the-spot report was prepared by their reporter-cameraman team while the class was in session. Students were working in the background as the reporter described the appearance of a "new corporation in Hesston." The three-minute videotape used on the station's newscasts featured close-up views of the students as they performed their specialized tasks. The students performed like seasoned troupers under the camera's eye when the commercial television crew was filming them, despite their occasional giggles when one of the high school seniors prepared a video tape for the school.

The team of three industrial arts teachers at Hesston have worked together exceptionally well to provide the community with an industrial arts program of outstanding quality. They have had the support of the school administration and of the community, as well as occasional assistance from teacher education institutions. Still, the primary impetus for the development of the outstanding program described here rests upon the teachers. Their commitment has resulted in a breadth of instruction seldom found in a small community, and rarely accomplished by only three teachers.

### CREATIVE PROBLEM SOLVING AT MAC DONALD

MacDonald Middle School is housed in an award-winning contemporary building nestled into a hillside in East Lansing, Michigan. The city, home of Michigan State University, is adjacent to Lansing, the state capital. East Lansing has a predominately white, upper-middle class population of approximately 30,000, many of whom are affiliated with the university or with the state government.

A two-level library-learning center serves as the nucleus for the academic classroom clusters at MacDonald. Facilities for industrial arts, art, and music are grouped in a well-arranged wing of the brown brick building, which has received national attention (*American School Board Journal*, 1969). The school, one of two middle schools in East Lansing, is designed to house 850 students. The present population is approximately 550 students in grades six, seven, and eight.

Team teaching is used extensively in all three grades at MacDonald. Interdisciplinary teams of two, three, or four teachers are responsible for the instruction of large groups of students in English, mathematics, science, and social studies. Each team has considerable freedom in planning learning experiences and scheduling large-group, small-group, and individual activities during a four-hour block of time during the school day. Flexible facility arrangements in the academic area of the building make it possible for the teams to work with varying sizes of groups simultaneously as the students study the subject matter areas via different learning techniques. Also, it is possible for the teachers to group their students for the most efficient learning within each subject as well as within the block of time. Throughout the program, the emphasis is upon individualized learning.

The team teaching approach has also been used in a unified arts program at MacDonald. During the first year of the school's operation, 1969-1970, an art teacher and an industrial arts teacher worked with a group of 65 sixth grade students in a program which sought to integrate the experiences in the two fields. In addition, the program activities were closely correlated with the social studies activities of the group. For example, primitive

crafts like weaving accompanied the study of primitive cultures. When the Roman civilization was the center of the social studies instruction, students were involved in the design and creation of mosaics in their unified arts program. This program was housed in adjacent facilities planned for art, industrial arts, and ceramics. Unfortunately, increased sixth grade enrollments in subsequent years without additional facilities along with scheduling problems has forced the school to abandon the unified arts program, despite the fact that it was well received. Since the school received a full complement of students in each grade in 1970, students in sixth grade have been permitted to enroll in art classes or music classes, but no facilities have been available to provide industrial arts experiences for the sixth grade students.

The basic industrial arts course in the school is offered at the seventh grade level, when one semester of industrial arts and one semester of home economics is required of all students. Eighth grade students may elect an industrial arts course which runs for the full year. In addition to the two formal courses, an informal laboratory experience is provided for sixth, seventh, and eighth grade students during the weekly period provided for self-chosen activities. Each phase of the industrial arts program is discussed in more detail below.

The industrial arts course for seventh grade students concentrates upon problem-solving approaches in a laboratory program covering the study of woods, plastics, graphic arts, drawing and communication, metals, and quantity production. From the beginning of the course, students are encouraged to start with their own ideas, to communicate the ideas, to plan their activities, to conduct appropriate preliminary experimentation and practice, to do the actual construction, and to complete an objective evaluation of their work. A programmed introduction to problem solving processes has been prepared by the teacher, James S. Levande. The branching program uses a design problem to provide hands-on experience in problem solving, emphasizing the techniques to be followed in the course. Students are required to design, construct, and test a device which will support a specified weight across a given span, using a limited amount of paper supplemented by rubber cement. This introduction avoids the instructional problem of teaching tool use concurrently with the initial problem solving experience, yet provides the opportunity

for a satisfying accomplishment in meeting the stipulations for a successful solution.

The semester's instruction is initiated with all students working in one area—usually woods because of the availability of work stations and the ease of working with the medium. As soon as individual students complete their work in woods, they move on to other areas, working on individual problems at their own paces, but branching out to cover all the instructional areas during the semester. For each individual's work in an area, he selects a problem from a list of suggested problems or identifies another of his own choice. The development of a design is guided by a planning sheet prepared in flow chart format—an innovation which has high intrinsic interest for today's computer-minded youths. The design statement is verbalized, possible solutions evaluated, and the instructor's approval obtained for preliminary and finalized design solutions. Before any construction begins, the student evaluates the design and planning phases, using a design check list which focuses attention on specific factors categorized under four areas: design considerations, structural properties, environmental conditions, and human factors.

Near the end of the semester, the seventh grade students complete their individual activities and work together on a production effort. The classes produce an inexpensive product that can be sold in relatively small quantities to their fellow students. Posters, book covers, and printed sweatshirts have been typical products. This project serves to provide a unifying experience which builds student interest and publicizes the work of the industrial arts classes.

Students who elect the one-year industrial arts course in the eighth grade work primarily on individual problems. During the year, the boys and girls are expected to build upon their experiences gained during the seventh grade course. Students in the eighth grade course are involved in a broad array of activities covering the full range of industrial arts subject matter, from ceramics through welding. Experimentation plays an increasingly important role as the eighth graders develop approaches to problems of their own selection. Students frequently work in small groups to learn to use equipment they need to create their design solutions. Practice activities serve to build the skills needed for the actual construction. However, these are individ-

ually selected skills; no attempt is made to develop specific skills across all areas.

As a supplement to the formal courses for students in grades seven and eight, and to afford a limited introduction to industrial arts for sixth graders, a relatively unstructured laboratory experience is available to students during an activity period. Those who wish to pursue activities of their choice may schedule laboratory time during the weekly periods. At these times, an industrial arts teacher and a social studies teacher who has competence in graphic arts work together with small groups and individual students. This is an extremely popular activity which has provided enrichment opportunities for students who could not elect industrial arts.

The industrial arts program at MacDonald Middle School is an outstanding example of the accomplishment which is possible for an individual teacher who utilizes available sources of vitality in his school. While this program operates in a school which encourages innovation and individualization of instruction, the resources available for the industrial arts program are not particularly outstanding. In the final analysis, the efforts of the teacher must make the difference.

### OAK GROVE JUNIOR HIGH SCHOOL

Bloomington, Minnesota, is a growing middle-class suburb of 90,000. Since it is adjacent to Minneapolis, its overall development is integrally related to that of the Twin City metropolitan area. While Bloomington is perhaps best known to many sports fans as the home of professional football and baseball teams, the city also has a strong industrial base. Light industries predominate, with metals processing plants, farm machinery manufacturing, and data processing firms as representative examples.

Many of the skilled and technical workers and managerial personnel who reside in Bloomington find their employment in other parts of the metropolitan area. Bloomington is surrounded by other municipalities, though its geographic area is not yet fully developed. Consequently, there is still room for expansion and development within reasonable limits. The overall impression one receives from the city is that of a pleasant community, not quite so pretentious as the stereotyped "suburbia," but definitely a desirable place to live and work.

School enrollment patterns in Bloomington have begun to approach a relative stability. In addition to neighborhood elementary schools, the city has four junior high schools, each serving approximately 1450 students in grades seven, eight, and nine. The three senior high schools each enroll approximately 1600 students in grades ten through twelve. Of the four junior high schools, two may be categorized as traditional and two as innovative. One of the latter, Oak Grove Junior High School, has an industrial arts program with several innovative features. This school and its program are described in some detail in the remainder of this case study.

Oak Grove Junior High School is housed in an impressive contemporary building which opened in September, 1969. The building was planned to facilitate individualized learning and maximize the development of each student. The school utilizes modular scheduling, team teaching, differentiated staff assignments, and flexible use of space to provide instruction for large groups, small groups, and individuals in each subject area. Out-

standing provisions have been made for the use of instructional media, including a random access audio learning system. Each subject area has a resource center in addition to the central resource area which includes 160 individual study carrels as well as the usual accouterment of a school library.

A team of four industrial arts teachers offers courses for students in grades eight and nine at Oak Grove. One of them, William W. Mamel, serves as the coordinator for the group. All four teachers have served on the faculty of the school throughout its brief history. They have been assisted at various times by aides, interns, part-time librarians and clerks, and have usually shared their responsibilities with one or more student teachers. There have been occasional periods when no para-professional personnel served as part of the team; the four teachers then operated the program without assistance.

Oak Grove is one of those rare situations where professional educators participated in planning their instructional programs and the necessary physical facilities for effecting the curriculum. The Bloomington school system designated administrators and subject area team coordinators before plans were finalized for the new building. Mamel and his colleagues were encouraged to plan and implement an innovative, forward-looking educational experience. Within this frame of reference, then, the program was outlined, facilities readied, and the faculty selected.

The nucleus of the Oak Grove industrial arts curriculum is the program required of all eighth grade boys. This course meets three days per week throughout the school year. During the first semester, students are introduced to technology through units on manufacturing processes, material processing characteristics, and communications techniques. The experiences during this semester are intended to introduce the students to the laboratory facilities and to develop their competence in the use of tools, machines, and equipment used in the production and manufacturing units during the next semester.

The second semester course for eighth grade boys is devoted to production. The first half of the semester involves activities in units on the history of technology, industrial organization and management, design engineering, methods engineering, and systems engineering. The last half of the semester is devoted to a manufacturing activity, including employment procedures, in-

class mass production of one or more products, and sales and distribution of products.

The same product or product lines serve to focus the study and activities of a class throughout the second semester program. During the first year of the program's operation, the products were student-designed. Pre-designed prototype products were prepared by the teachers for use in the classes during the second year. This procedure seemed to be more efficient in classroom operation. Students still were involved in such planning functions as the development of the necessary working drawings, assembly drawings, specifications, operating instructions, and guarantees. They also participated in the preparation of jigs and fixtures for their production activities.

Several noteworthy features characterize the manufacturing activities. A "company" is capitalized via the sale of stock to students. However, the "company" has divisions in each of the eighth grade classes. Therefore, each company operates during each class period. Students in a given class work for their division of their firm in direct competition with other students making other products for other firms. Successful production and profitability become meaningful criteria for success under this arrangement. However, this technique creates significant managerial problems for the instructional team which must coordinate the manufacturing of several products during each of several classes.

The size of production runs for each company was established by the combination of capitalization and firm orders. Class members were permitted to purchase one product for themselves at "wholesale" prices. In addition, advance orders were taken for sales to individuals outside the classes. Consequently, the firms produced only to meet market demands, rather than attempt speculative stockpiling in anticipation of sales after the production run. A representative product is a hot dog cooker manufactured of plastic, metal, wood, and electrical components by one of the companies during 1970-71. In addition to the large number of processes involved in its fabrication, the students printed an instruction manual and labels, then packaged each unit in transparent plastic.

Ninth grade boys at Oak Grove may elect another unusual industrial arts course. During the first semester, students study structural technology; during the second semester, systems technology serves as the center of emphasis. The structural technology

program involves required work with civil/building construction. In addition, each student elects additional work in one of these areas: marine, aerospace, and highway/railway. Instruction in systems technology is organized to provide six weeks of experience with each type of system: fluid, electronic, and mechanical. This program is organized to reflect an analysis by the team of teachers which identified systems and structures as the two fundamental divisions of technology. The organizational structure outlined for the ninth grade course was selected to present the content and experiences considered appropriate for each of the subdivisions of technology.

Instructional materials, or rather, the lack of available instructional materials, has imposed significant limitations upon the innovative courses at Oak Grove. While the teachers borrow freely from the ideas of the several industrial arts curriculum efforts, they have not elected to adopt the approaches recommended by any curriculum project as their total program. Instead, they have attempted to organize and operate courses which synthesize the recommendations of several groups. Consequently, the instructional team needs a wide variety of instructional materials covering a full range of industrial arts content, but organized to fit within their instructional system. In addition to providing appropriate content coverage, the materials need to be organized to provide for individualized progress, to permit utilization of the available flexibility in the use of media, in scheduling class time allocations, and in the use of laboratory facilities. The lack of these types of instructional packages has made it especially difficult to implement a highly unusual approach, such as the semester course on structural technology at the ninth grade level. Time limitations have made it impossible to provide adequately prepared multi-media instructional materials which fit within the conceptual framework of the course; some retreat toward the more conventional organization has been necessary, at least for the short term.

The unusual circular floor plan of the instructional facilities at Oak Grove facilitates innovative teaching. At the hub of the unit is a faculty office/planning area with visibility into each of the four surrounding instructional areas. Instead of the usual subject-matter-designated rooms, the spaces in the area are assigned to functional activities: communications, research and development, and production manufacturing. The resource cen-

ter serves as a classroom, a class headquarters, a seminar space, and as a location for instructional materials. Individuals, small groups, and classes work in the atmosphere, using instructional techniques which may vary from learning activity packages through discussion to lectures. While the existence of such facilities may not be an absolute prerequisite to the kinds of innovation which have been implemented at Oak Grove, the structural arrangement is a definite contributor to the success of the program.

The industrial arts program at Oak Grove Junior High School is an outstanding example of what can be done when imaginative planning is combined with effective, innovative teaching in an atmosphere conducive to the exploration of new curricular approaches. Only preliminary evaluative attempts have been made to date, but a comprehensive evaluation of the Oak Grove program in comparison with other Bloomington schools is scheduled for the 1971-72 school year. As additional industrial arts teachers are added to the faculty, plans have been made to provide instruction for seventh graders who cannot now be served. To the interested observer, there are indications that the program at Oak Grove is an excellent example of successful local innovation, based upon local initiative, and implemented by internal professional personnel.

### **MASS PRODUCING THE INDIVIDUAL PROJECT EIGHTH GRADE INDUSTRIAL ARTS—PITTSBURG**

Pittsburg, Kansas, is a college town of 20,500 population in the extreme southeastern corner of the state. The city's junior high school and senior high school share an older building located between the downtown section and a residential area. Industrial arts courses for the junior high school are taught in a small general laboratory in one corner of the junior high wing of the main building; senior high school industrial arts courses are housed in a separate facility.

Pittsburg has a comprehensive industrial arts program for junior and senior high school students. A full year of industrial arts is required of all eighth grade boys. Seventh grade students may elect a basic industrial arts course; ninth grade boys are eligible to enroll in an industrial arts course in materials and processes. The program for grades ten, eleven, and twelve provides additional work in materials and processes, woodwork, graphic arts, auto mechanics, drafting, and machine shop. An opportunity to pursue independent study activities on a contract basis and in-depth pre-vocational experiences are provided in graphic arts, power mechanics, and woodworking.

An unusual extra-curricular activity, PHS Woodworkers, Inc., is available to students in grades nine through twelve. This club sells stock, buys materials, and mass produces products which are sold at a special "Annual Industrial Arts Sale," a combined effort of junior and senior high programs held in a local shopping center. During 1970-71, the group produced note pad holders complete with specially printed note pads and custom embossed ball point pens which read, "Industrial Arts Education—The Study of American Industry, Pittsburg City Schools, Pittsburg, Kansas." The production run was totally inadequate to meet the demand for the product at \$2.50 per note pad. Since this is an extra-curricular activity, students do all the tooling and production outside of class time, working after school and during their evening sessions. The approach resembles the Junior Achievement organizational pattern, but PHS Woodwork-

ers stresses the production processes, rather than emphasizing organizational and managerial procedures.

The eighth grade industrial arts course conducted by Max E. Lundquest is the core of the industrial arts program at Pittsburg. This one-year course, required of all boys, provides for the mass production of individual projects in a unique way. In addition, a wide range of instructional approaches provides experiences in line production and in exploration of a diverse sampling of subject matter.

The course begins with orientation and safety discussions, then moves to introductory demonstrations on the activity areas covered in the laboratory. While the classes are organized on a multiple-activity basis, preliminary instruction in all areas is given to the entire class. Students are required to take individual notes on prepared forms which have space for listing equipment needs; preparation procedures, operation of the process, and cleanup; as well as observations of the outcomes of the demonstrations. These notes serve as guides for the students during their subsequent work in the areas.

Students work in teams of two in their exploration of the twelve areas in the course, spending one week in each area. The twelve activities are: vacuum forming, rotational molding, styrofoam molding, foundry, printing, electric wiring, electronics, wood turning, metal machining, power mechanics, woodworking, and ceramics. Compact equipment packages have been shop-fabricated to provide efficient instructional arrangements for several areas. Portable, bench-height cabinets with storage space for the necessary equipment and supplies make it possible for students to perform their experiments or exercises without moving around in the laboratory. One unit serves for foundry activities, another for vacuum forming; others are used for slip casting, rotational molding, and power mechanics. These units provide a viable approach to individualized instruction in a facility which is quite typical of older school buildings: pillars, hard maple floors, brick walls, large windows with radiators beneath; little wall storage area or intrinsic flexibility in the use of space. Considerable ingenuity has also been exercised in developing and fabricating improvised equipment for the course. For example, a rotational molding device has been developed on a detached door for a kitchen range oven. Mounted on casters, the unit can be moved into position for molding with the door

sealing the oven opening. After the molding process is completed, the unit can be rolled back from the range for cooling without stopping the rotational action.

Following the twelve-week exploration period described above, the classes move into a production experience. The individual project is retained in this approach, which permits groups or "companies" to be formed to produce one product for each member. There are usually three or four groups, each producing a different product, within each class. If a group is producing bookcases, all its members will ultimately get one of their own. The individual may decide which of the available woods he wants to use for his own bookcase, and some freedom is permitted in non-structural design, decoration, and finish. However, the basic dimensions and structural product design are identical for all the products of the group.

The actual construction of the individual projects utilizes mass production techniques. Jigs and fixtures are used to insure interchangeability of parts. Joints are cut on all products with one machine set-up. After the inventory of parts has been prepared, small assembly lines are used where these are feasible. Individuals take sole responsibility for finishing their projects. Consequently, they have some of the pride of accomplishment and involvement which characterizes the individual project, while experiencing some of the procedures basic to mass production.

A culminating experience provides an opportunity for the entire class to work together in a line production effort to produce an item to be sold at the "Annual Industrial Arts Sale," with the profits going to the industrial arts account in the school. The class designs a product, does a market survey, constructs the jigs and fixtures, and produces the product. One activity which has been quite popular has been the assembly, finishing, packaging, and sale of fishing lures. Unfinished lure bodies and component parts are purchased from wholesale suppliers. Finished lures are sold through local sporting goods outlets. This product has good motivational attributes, sells well, and incorporates a number of steps in production.

While the influence of teacher educators at the local Kansas State College is acknowledged by the team of teachers at Pittsburg, the outstanding course described here is clearly a product of creative, innovative teachers. It operates on a minimal budget in severely limited facilities, yet provides an excellent contemporary course for Pittsburg's eighth grade boys.

## CAREER ORIENTATION IN DAYTON

Dayton is an industrial city of approximately 275,000, the center of a major metropolitan area in the fertile Miami valley in southwestern Ohio. The city has played an important role in the development of aviation. The Wright brothers were Dayton residents, and their legacy is still apparent. Wright-Patterson Air Force Base, a center of research activities, is also the site of the Air Force Museum, which preserves memorabilia from the history of aviation. Five institutions of higher learning are located in Dayton, which also supports a wide variety of cultural activities.

The area has a well-diversified industrial base, including several plants which produce accessories for the automotive industry. Most of the light industries are represented in the metropolitan area. Consequently, the local economy reflects the national scene rather closely in terms of recessions, unemployment, and periods of prosperity.

Industrial arts occupies a prominent position at all levels of the Dayton public schools. While this discussion focuses upon the program for early adolescents in keeping with the theme of the yearbook, other aspects of the Dayton industrial arts program also merit consideration as outstanding examples of their genre. At the senior high school level, a full range of industrial arts courses is offered, including an occupational laboratory course for tenth grade students to prepare them for cooperative work experience programs in grades eleven and twelve. One elementary school is engaged in a pilot study of a "World of Work" program for grades K through six. Two middle schools have initiated a unified arts program; another is involved in a pilot study of the Construction and Manufacturing courses prepared by the Industrial Arts Curriculum Project. All other schools provide a practical arts program for both boys and girls in the seventh and eighth grades.

The Career Orientation Program has been selected as the focal point of the present discussion. This program serves both boys and girls in grades seven and eight. (In the five middle schools which serve grades six, seven, and eight, the career orien-

tation activities are a part of the instructional program for all students.) Reynolds (1970) described the early stages in the development and implementation of the program. The present report examines progress during the second year of program operation and elaborates on approaches and procedures used in effecting the innovative program.

The Career Orientation Program began as a pilot program during the 1969-1970 school year, partially supported by State of Ohio Vocational Education Department funds. The Dayton schools submitted a proposal to the State of Ohio in May, 1969, obtained approval for it during the summer, and conducted preparatory activities necessary to open the school year with the program in operation in six pilot schools. Industrial arts teachers and facilities provided the base for the program which included manufacturing, construction, power, services, horticulture, distribution, and marketing. Other instructional departments were involved in the pilot program, which included major units in home economics, science, and mathematics, as well as the industrial arts content. In 1970-1971, the program was modified, expanded, and implemented in four additional schools. A total of 130 teachers and nine counselors worked with 2468 students in the program described below. Additional modifications and more widespread implementation are under way as this report is prepared.

The Career Orientation Program has expanded to include instructional materials covering the entire school program. Sample learning guides have been prepared for science, home economics, industrial arts, language arts, social studies, guidance, mathematics, arts, and music. Teachers from all these fields are active participants in the implementation of the instructional program. Within the school setting, the teachers work as a more or less formal team to correlate their efforts around the career orientation activities.

The primary purposes of the Career Orientation Program are to provide students with experiences which will help them acquire knowledge of the jobs and career alternatives in society; learn about the requirements for entry and success in a variety of jobs and careers; develop an understanding of their personal skills, abilities, and aspirations; understand the value, worth, and dignity of socially useful work, and develop attitudes which will assist in the fulfillment of their career goals. Within this

broad framework, rather specific objectives, many stated in behavioral terms, have been formulated to guide the instructional effort.

Activities in the Career Orientation Program are closely related to the career opportunities in the various fields of study and to the specific behavioral objectives of the course. For instance, in the construction area of the industrial arts portion of the program, students are involved in the design and construction of home models, the preparation of plans and models for community planning, the development of modular framing units, construction of a mock-up of a house frame, and field trips to construction sites. Contests are conducted within each school as a part of the model home construction activity. Winners from each school are displayed in a public exhibit, judges evaluate these, and grand prizes are awarded. When construction sites are visited, enough time is allocated to permit students to get a report on the occupation and activities of each worker.

Production activities have been highly effective. Among the more successful products has been a small toy truck which doubles as a pencil holder. Girls have been especially interested in the production of frames to be used in displaying needlework from their home economics activities. Science classes have been involved in the assembly of small electric motors and in the production of small items which involved joining dissimilar materials. Candle holders with wooden bases and expanded metal "globes" provide a multi-material product with high interest value. Board games produced from kitchen cabinet countertop remnants offer a challenge in production design, but are low-cost and of high intrinsic interest in the students.

Teachers in areas outside home economics and industrial arts have been quite helpful in achieving the objectives of the program. Music teachers have helped their students understand the construction and repair of instruments through demonstrations and field trips. Art classes have designed and silk screened containers for products produced by the Career Orientation students. Mathematics classes are involved in geometric layouts of products to be made from sheet metal, in framing problems, and in other work requiring the use of rulers and micrometers. In addition, mathematics teachers provide experiences with adding machines and cash registers, budgeting problems, and income tax prepara-

tion. Language arts teachers help students in the preparation of job applications and in interviewing practice. English classes regularly visit an evening newspaper plant after the peak production period, when they can talk to the reporters, editors, and production employees about their work.

An integral part of the Career Orientation Program is the "Career Carnival," when outside consultants come to school wearing their working clothes and carrying some of their typical equipment. These events, conducted at least once per semester, provide students with an opportunity to hear individuals discussing their jobs and describing some of their daily activities. During this program, the consultants move from class to class within a school, talking with students and answering questions. A recent group included a television reporter/newscaster who taught students to operate his movie camera and scientists from a plastics molding firm who conducted an in-class experiment with polymerization. Other consultants included a fashion consultant from a department store, a funeral director, a television cameraman, and a nurse. Each person who serves as a consultant to the program receives a special certificate of appreciation suitable for framing.

An important factor in the success of the Career Orientation Program has been the emphasis upon in-service workshops. Each year, teachers participating in the program have devoted one or two weeks to intensive preparation just prior to the beginning of the school year. Outside consultants discuss relevant professional topics and present information about new developments in instructional materials or in technical fields. Industrial tours provide an interesting way to acquaint teachers with contemporary practices. Successful Career Orientation teachers describe their strategies and techniques to their colleagues. Half-day sessions are provided for small groups of teachers to work on the preparation of instructional materials; these have been incorporated into a curriculum guide which has been duplicated for distribution to the Career Orientation teachers. Additional in-service sessions are conducted at intervals during the academic year to encourage teachers to share their experiences. Since the program is not standardized from school to school, the in-service activities are especially helpful in assisting teachers in the selection of outside speakers, planning of field trips, and identification of effective classroom activities.

## JUNIOR HIGH SCHOOL REVISIONS IN ORANGE COUNTY

The metropolitan area of Orlando, Florida, is one of the most rapidly growing areas in the United States, with a current population of approximately 470,000. Located in the citrus area of central Florida, the region has a well-diversified economy which was originally based upon agriculture. Many Orange County residents have been employed by the space-related industries of Cape Kennedy, fifty miles to the east. Others are affiliated with insurance firms which have selected Orlando as a center for their operations in the Southeast. The most recent development in the area is the October, 1971, opening of Disney World near Orlando. Employment, population, and tourism are expected to exhibit marked increases in the immediate future.

Schools in the Orange County system serve approximately 90,000 students, double the number enrolled ten years ago. The basic organizational pattern includes neighborhood elementary schools, sixteen junior high schools serving grades seven through nine, and seven senior high schools with grades ten through twelve. One junior high school serves grades seven and eight; one senior high school serves grades nine through twelve. Two schools serve grades seven through twelve, and one school serves grades K through twelve.

Industrial arts is available as an elective subject in grades seven through twelve. During the 1971-72 school year, the system is involved in an exemplary program to provide career-opportunity-related education in grades K through twelve in one senior high school, three junior high schools, and six elementary schools.

The typical junior high school in Orange County has three industrial arts laboratories: drafting, metals, and woods. Until recently, the seventh-grade course has been a semester of drafting. Eighth-grade students could elect a semester of woods, while ninth-grade students could enroll in metals. Changes in these courses are discussed in some detail later in this section. The senior high school industrial arts program provides depth experiences in drafting and the other traditional industrial arts areas. A vocational high school operated by the Orange County system and an area vocational school provide opportunities for occupational education.

During the fall of 1968, a group of industrial arts teachers in Orange County worked under the leadership of their supervisor, Marion A. Brown, to revise their traditionally-oriented industrial arts courses which emphasized drafting, craft work, and project construction. This curriculum project was funded by a \$10,000 grant from the Florida State Department of Education. Donald F. Hackett headed a group of outside consultants, which included Keith Hickman and Donald C. Whaley from Georgia Southern College, and Charles G. Risher from Western Michigan University. A team of sixteen teachers worked with the supervisor and the consultants during weekends and holidays to prepare comprehensive outlines for the new courses. The curriculum sequence which was developed provided a course in communication for grade seven, a manufacturing course for grade eight, and a ninth-grade course in power. These courses were introduced into the first schools in September, 1969.

### **Communications**

The seventh-grade course developed by the group presents a comprehensive study of graphic communications. The program emphasizes concepts rather than skills and attracts almost equal numbers of boys and girls. Man's primary need to communicate serves as the unifying theme for the study of communication. Students are introduced to creative design problems and processes, working with sketches to communicate ideas. Reproduction processes are presented as aids to communication. Students design and produce items by silk screen, letterpress, offset, and block printing. They are introduced to photographic processes, equipment, and materials. Electronic communication is studied in terms of the basic electronic functions and the applications of electronics in audio devices, video devices, and pulsed devices.

The seventh-grade program outlined above has been implemented in six of the junior high schools of Orange County. In each case, the program has started in the former drafting room of the school and equipment has been added to provide for the expanded scope of activities. However, the course is more than the mere addition of printing, electronics, and photography to drafting. It represents an effective way to unify instruction about man's communication methodologies and media without unnecessary involvement in repetitive activities.

## Manufacturing

Manufacturing, the course developed for the eighth-grade student, introduces the design, engineering, production, and marketing of manufactured products. As an initial orientation experience, students produce a small product using teacher-prepared set-ups, jigs, and fixtures. For instance, a class may produce enough recipe holders for each student to have one to take home to his mother. Everyone in the class is involved in the production, but no one does all the operations for any product. From this beginning, students move to participation in the organization of the class as a manufacturing company. In addition, they study the operation and functions of corporations.

Each company sells its stock, usually within the classroom group, and issues its individually-designed stock certificates. Market surveys to identify the most desirable alternative designs and finishes follow the design of a product and construction of prototypes. After a design is finalized, the production procedures are planned in detail, the production run is made, sales are conducted, and profits are distributed. Nearly all companies have been profitable; one returned \$1.05 for a \$0.35 investment.

Several variations of the manufacturing theme serve to illustrate its flexibility. One company has produced quantities of bird houses for a local department store under an informal subcontract. In another instance, a group produced dog houses under a similar arrangement. One teacher, confronted by a shortage of equipment, set up his classes as service-oriented companies. Antique furniture refinishing was chosen as the corporate activity. The groups (classes) bid competitively for available jobs and performed them to the owner's specifications. One manufacturing company produced emblems to be worn on a chain around the neck in the currently popular style. Demand for these was so high that they were sold the period following painting, even before the finish was dry.

Manufacturing courses are being taught to eighth-grade students in fourteen Orange County schools. In most cases, the course is taught in laboratory space formerly used for instruction in woodworking, though it has been successfully introduced in other facilities. An attempt is made to provide basic equipment for processing woods, metals, and plastics to permit some flexibility in the selection of materials and products.

### **Power**

The ninth-grade course, power, investigates the sources, control, measurement, and distribution of power. Mechanical, hydraulic/pneumatic, electrical/electronic, and internal combustion systems are studied in the program. As the integrated power program evolved, considerable difficulty was experienced in obtaining suitable multi-purpose equipment. An original design has been developed utilizing a central console consisting of two independent units: (1) a hydraulic pump with a system of transparent quick-disconnect hoses and valves; and (2) a power supply for six and twelve volts, with both alternating and direct current. Four work benches are attached to the console in an X-pattern, with each arm providing work stations for a team of two students and space at the outer end for mounting a small gasoline engine.

A series of experiments is used in the electricity/electronics portion of the one-year course. A similar series of exercises is used in hydraulics and pneumatics. The lack of test benches has restricted activities in small engines to somewhat traditional assembly, disassembly, and trouble-shooting routines. In most instances, the power course is being conducted in facilities which were formerly used for metalworking. Five of the Orange County schools have the ninth-grade course in operation during the 1971-72 academic year.

### **Summary**

Throughout the series of courses, three objectives are primary: (1) understanding of industry and technology; (2) individual development of problem-solving abilities; and (3) discovery and development of individual aptitudes. No single objective is permitted to dominate the program in order to insure well-rounded instruction for all who enroll. The lack of commercially-prepared instructional materials organized in the sequences used in the courses has created some problems, as might be expected. Teachers have relied heavily upon handout materials which students assemble in their individual notebooks.

As the program continues to evolve, the teachers of each of the three subjects meet regularly with the supervisor in an ongoing course development effort. Teacher turnover and the expansion of the program into more schools during each of the three years of its operation means that new personnel are working with the programs each year. In-service conferences, activi-

ties, and involvement are most helpful in orienting new teachers and capitalizing upon the experiences of the group.

While it will be some time before the innovative junior high school program described here can be implemented in all Orange County schools, effective progress has been made in the short time span of three academic years. This successful effort is an excellent example of a methodical, realistic approach to curriculum innovation in industrial arts for the early adolescent.

### NINTH-GRADE INDUSTRIAL ARTS: EVANSTON, ILLINOIS

Evanston Township High School serves approximately 5200 students in grades nine through twelve. Evanston, an upper-middle-class suburb of 80,000, contiguous to the north side of Chicago and fronting Lake Michigan, has two school systems: one responsible for the senior high school, the other for the elementary and junior high schools. The senior high school attempts to provide something of a small-school atmosphere by operating as four semi-independent administrative units ("schools"), each in a wing of the main building. Each school has its own academic classrooms, faculty, and curriculum supervisors. However, only one set of facilities is provided for art, industrial arts, speech arts, home economics, business education, music, and physical education—subjects which require large areas of space and substantial capital investment.

The fact that there are two separate school systems in Evanston means that responsibility for the community's industrial arts program is also divided. Industrial arts courses in the four junior high schools provide an example. One junior high school was actively involved in the field testing of the Industrial Arts Curriculum Project materials throughout the developmental phases of the Project. The industrial arts program in that school consists of a seventh-grade course in "Construction" and an eighth-grade course in "Manufacturing." A second junior high school has inaugurated the IACP program for the 1971-72 school year. The other two junior high schools have retained relatively traditional industrial arts programs at this writing.

Evanston Township High School has utilized modular scheduling on an experimental basis for some time. However, the size of the student body and the consequent complexity of the scheduling problem has forced the school to schedule ninth-grade students for three-mod classes (55 minutes). The ninth-grade student, therefore, has a schedule which resembles the traditional high school program. There is one bit of scheduling latitude remaining in the 1971-72 school year: teachers may exercise their discretion in requiring student participation during one of the three-mod class meetings each week.

Students enter the senior high school with widely varying backgrounds in industrial arts. Approximately 325 students elect the ninth-grade industrial arts course, which provides broad, generalized experiences in materials and processes, as well as production activities. An unusually diversified range of courses is available in grades ten through twelve: three-year sequences in electricity/electronics; technical drafting; graphic arts; metals; woods and building construction; and power technology and automobile mechanics. Specialized courses are available in service station management, welding, and in Diversified Occupations.

Behavioral objectives have been developed for all industrial arts courses at Evanston Township High School. Teachers have been involved in summer workshops for curriculum development, with stipends provided by the school system. Consequently, it has been possible to revise courses frequently and to develop a limited library of individualized instructional materials. This degree of support has facilitated adaptations of the ninth-grade course as the instructional team has varied from year to year.

The ninth-grade industrial arts program which was taught in Evanston from approximately 1950 until 1964 provided exploratory experiences in woods, metals, graphic arts, electricity, drafting, and power. Attempts were made to articulate the activities in the respective instructional units, yet each was taught as an introduction to further course work in the area. As the opportunity arose to re-evaluate the practices in the course, the teachers sought outside assistance and stimulation in re-directing their efforts.

The manufacturing approach which characterizes the second semester's work in the present ninth-grade industrial arts course has evolved over a period of several years. Supervisor William T. Clanton called in Jacob Stern and Edward Anderson from the University of Illinois to work as consultants with the enthusiastic team of Evanston teachers in the development of the initial design for the course. During a 1964 summer program, incoming ninth-grade students designed, produced, and sold products; this pilot program served as a model for the revision of the ninth-grade course. The new emphasis in the course was inaugurated during the 1964-65 school year.

A building expansion program made it possible for the faculty to plan a facility especially for the ninth-grade program. The

initial plans were for a team-taught course utilizing a small auditorium for large group instruction, small group seminars scheduled in a modified drafting room, and laboratory activities scheduled for two periods per week. Plans were developed for a relatively large multi-purpose general laboratory to provide ample space and facilities for the activities envisioned for the laboratory portion of the course. The space was obtained by remodeling existing spaces; funding limitations precluded the installation of adequate utility services and the provision of some desirable physical features, such as sound treatment, dust collection and ventilation equipment, and non-skid flooring. Even when funds were available, there was a lack of commercially-available equipment which could be used in support of manufacturing activities at the ninth-grade level. Nevertheless, the laboratory which was developed provides an adequate open area for a variety of activities and maintains a high degree of flexibility in equipment installation.

There are thirteen classes in ninth-grade industrial arts at Evanston Township High School. These must be accommodated in two rooms: the multi-purpose general laboratory described above, and a classroom-drafting room. Two classes are scheduled each period of the school day. Each class meets in the two rooms on alternate days. That is, while one class is in the laboratory, another is in the classroom; their meeting rooms alternate on successive days.

Instruction in the first semester of the ninth-grade course resembles traditional industrial arts programs. Each student completes individual projects, beginning with a project in woods. As individuals and small groups complete their first projects, they move on to construct projects in metals, including sheet metal, foundry, and welding. In addition, graphic arts and plastics instruction is included in the first semester's program. During the semester, classroom instruction involves topics related to the laboratory activities, graphic communication, and an introduction to industrial production.

The second semester's work builds upon the basic familiarity students have with the laboratory and its equipment and their fundamental planning skills to design and produce items for use in the school or by students. Evanston has outstanding Junior Achievement opportunities for senior high school students. The

school therefore does not try to duplicate the Junior Achievement approach, involving the formation of corporations, sale of stock, retail sale of products to individuals outside the school, and the distribution of profits. Instead, the focus is upon the production processes in the laboratory and the related industrial functions in the classroom phases of the program.

Many types of products have been manufactured by the ninth-grade classes during recent years. In some instances, each class has made a different product; at other times two or more classes decide to produce the same product. Two especially popular products have been silk screened school pennants and trophies for the school's intramural program. Games and toys have been produced for nursery schools or for the Red Cross in some years. Typical products have been desk caddies, trivets, charcoal lighters, and dresser caddies. Because of the limitations imposed by the available laboratory equipment and the inventory of materials, most products are constructed of woods and metals, with an occasional application of plastics. The school furnishes the materials for one product per student on the individually-oriented items, as well as the material for items to be used in the school.

Implementation problems have accompanied efforts to improve the industrial arts offerings in the ninth grade at Evanston Township High School. From the outset, there have been shortages of the kinds of instructional materials which would help in teaching about production. Teacher turnover has inhibited continuity of planning and reduced the effectiveness of the team teaching effort. Student motivation has been a problem at times. Scheduling continuity is difficult when there is no latitude in the use of space—a class must be in the classroom one day and the laboratory the next. Many types of equipment needed for a realistic portrayal of manufacturing have not been available from commercial suppliers. For instance, it has been necessary to construct a conveyor in order to provide one for use in the classes. The shop-built article is an artificial intrusion into the instructional process rather than an item which supports the activity without calling attention to itself.

Despite the restrictions of space and facilities and the complex scheduling problems, the industrial arts faculty at Evanston Township High School has managed to implement and maintain an effective production experience for their ninth-grade stud-

dents. There has been substantial regression toward traditional content and activities in the course, yet manufacturing has retained a significant role in the program. The example has been selected as evidence that effective change can occur in the activities in industrial arts programs without excessive expenditures for supplies or equipment, and without disrupting the on-going school program.

### CONTINUING INNOVATION — NOVA

Many educational innovations come to light in settings in which innovation is not necessarily a prized commodity. Change may be permitted, or even given token encouragement, but the general aura of the educational climate leans toward a reproduction of the status quo. However, one setting is in direct contrast: the Nova Schools at Fort Lauderdale, Florida. The school provides unique individualized educational opportunities for approximately 3500 students on its attractive campus just west of Ft. Lauderdale. Two elementary schools serve about 700 students in grades K through five, two middle schools serve 1000 students in grades six through eight, and the senior high school enrolls 1800 students in grades nine through twelve. Any student in Broward County may apply for admission to Nova, which attempts to maintain its student population as a microcosm of the county's population.

This educational enterprise was established by the Broward County Schools as the center for research, innovation, and leadership in the evolution of new educational ideas. The school is dedicated to the concept that students should develop responsibility for their own learning program and their behavior. Teachers assume roles as resource persons and consultants as students pursue their individualized programs, working independently through each of their courses. Most courses are organized as a series of Learning Activity Packages (LAPs) which are completed by the student working at his own pace. A course is considered to be completed when the student has finished its basic LAP sequence. This may occur at any time during the extended school year; the student simply begins work on another individualized course without ceremony or delay.

Since they play such an important role in the courses at Nova, LAPs deserve special attention in this report. Each LAP is a carefully structured program, with clearly stated behavioral objectives, and with opportunities for the student to make choices in the selection of activities and the depth to which he wishes to pursue the activity. After a course has been planned in terms of scope and sequence of content, the sequence of LAPs is deter-

mined. Behavioral objectives are prepared for the LAP, stating the conditions under which the behavior is to occur and the criteria for successful performance. A self-test is prepared for the student to use as a pre-test before he begins work on the lap. After the completion of the test, the student may decide, in conference with his teacher, to go through the LAP in sequence, to go to advanced activities in the LAP, or to move on to the next LAP without delay. A variety of activities and assignments are sequenced to assist students in meeting the objectives of the LAP. Readings, problems to be solved, laboratory activities, and experiments are typically suggested activities. A wide variety of media and multi-media approaches may be used in the LAP activities. Students are encouraged to interact with other students, with their teachers, and with materials in the completion of the LAP requirements. When the student feels that he has met the objectives for the LAP, he completes the final evaluation for the LAP—an objective test taken in a testing center to avoid classroom interference. (Smith, 1969)

The industrial arts program at Nova is a part of “technical science,” along with art, business education, music, driver education and home economics. A comprehensive program is offered in technical science; three years of technical service are required for graduation from Nova High School. Industrial arts is first introduced in the elementary grades, where each of the schools has an industrial arts instructor and space available to assist teachers and to provide supervised opportunities for construction activities. In the middle school setting, students in grades six and seven spend half their school day in a broad-range program integrating science, industrial arts, and social studies (SISS). Eighth grade students have a ten-week course in American Industry. Ninth grade students may enroll in graphic arts technology, electronic technology, drafting technology, mechanical technology, and photography, among the subjects usually considered to be “industrial arts courses.” In addition, they may select from courses in the other areas of technical science. Students in grades ten through twelve may elect courses in aeronautical technology, technology and science (inter-relating physics, electronics, drafting, and mechanical technology), as well as a selection of advanced courses in drafting, electronics, and graphic arts. Also, vocational programs are available in graphic arts, electronics, and commercial art.

The idea of continuing innovation pervades the educational activities at Nova. Rather than seeking a settled answer, a finalized course or sequence, the teachers at Nova are constantly seeking a better way, revising and modifying their courses. The SISS program is an example. When the middle school started in 1970-1971, the instructional team devised an integrated program involving science, industrial arts, and social studies. Approximately three hours of the school day are devoted to SISS during grades six and seven. A series of five LAPs has been developed for use in teaching problem solving skills as a central theme for SISS. The sequence of problems in the SISS program is highly structured at first. Later, the instructional team simply specifies the basic problem dimensions, and students set the parameters for their investigations. As might be expected from such a major revision without funds for remodeling facilities or additional equipment, the introduction of SISS has not been without its problems. However, the program appears to offer significant promise for closer coordination of instruction. When it is placed alongside the eighth grade course in American Industry, it is obvious how innovative the SISS program really is; the American Industry course looks almost traditional in contrast.

Throughout the technical science program, the developmental activities of the instructional team are primary. Under the leadership of the supervisor of technical science, Robert Schafer, the teachers are engaged in a continuous program of course development. Consequently, the vitality of developmental activities pervades the atmosphere of daily instruction. While there are occasional set-backs as in any educational endeavor, the overall impression one receives from the Nova program is that of a stimulating environment for students and teachers alike.

### OTHER INNOVATIVE PRACTICES

In addition to the local situations selected for rather detailed descriptions in this chapter, a number of specific educational practices seem to be worthy of mention as ways to encourage educational innovation. Two are explored here: retreats and occupational exploration. These have been successfully applied in local settings and should merit consideration by other educators seeking to improve their programs.

#### Retreats

The Columbus, Indiana, school system utilized a form of the familiar "retreat" approach in the initial stages of curriculum revision. Industrial arts teachers spent a weekend in concentrated sessions at a state park inn. Their consultant, Ralph Bohn of San Jose State College, had familiarized himself with the local program prior to the retreat. He opened group discussions with comments about curriculum innovations of general interest to the group, then moved quickly to involve teachers in an examination of their programs. The group was able to explore areas of strength and weakness in their courses and to begin a consideration of ways to improve the Columbus program. The short period of time away from the day-to-day pressures of school, home, and community obligations is helpful in obtaining a clearer perspective of goals. The opportunity is available to establish a commitment to an approach and focus on specific problems for a concentrated effort at the development of solutions.

#### Occupational Exploration

While industrial arts programs have traditionally been concerned with some aspects of vocational exploration, new approaches to the introduction of occupational opportunities are worthy of consideration. In the Highline Public Schools of Seattle, Washington, John Lavender is directing a project intended to develop the "occupational versatility" of students in grades six through nine. Emphasis is placed upon individualized progress through a multi-media self-instructional system. Classes are

ungraded, and include students of both sexes and all grades. Students may work independently or as teams in the large, self-contained general shop facilities under the guidance of an instructional team. Emphasis is placed upon the development of self-sufficiency, productivity, and adaptability in the industrial arts environment.

At Clearwater Comprehensive Junior High School in Clearwater, Florida, seventh grade students are introduced to twelve occupational areas: drafting, dry cleaning, electronics, food services, construction, horticulture, power mechanics, graphics, metals, tailoring, home economics, and business. After the introductory semester, students are enrolled in one of the vocational courses for each subsequent semester. A work experience program provides off-campus opportunities for ninth grade students who are ready for competitive work environments. While the program is not closely related to an industrial arts course, the approach in this locally-sponsored innovation is quite promising.

### SUMMARY

Several threads of commonality unite local innovations reviewed in this chapter. Manufacturing activities in industrial arts courses for early adolescents, individualization of instruction, provision for independent study, and team teaching endeavors have been reported with some regularity. The specific innovations which have been observed are, of course, related to the situations selected for inclusion. However, there is adequate evidence that significant local innovation has transpired; the future of industrial arts depends upon the effectiveness of continuing efforts to improve the industrial arts program for early adolescents.

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# The Industrial Arts Teacher of the Early Adolescent

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When one reviews the evidence presented in the earlier chapters of this volume, he is immediately impressed by the magnitude of the demands which must be met by the industrial arts teacher of the early adolescent. The individual who selects this profession is expected to possess unusual personal attributes, an imposing array of professional competencies, and mastery of a broad range of subject matter. This chapter presents a compilation of impressions, recommendations, and suggestions from variety of sources. It does not pretend to provide a comprehensive guide to industrial arts teacher education. To do so would be to attempt to duplicate the work of Ray and Streichler (1971), who provided in-depth examinations of the content and method dimensions of teacher education.

## PERSONAL ATTRIBUTES

In recent years marked by a shortage of industrial arts teachers, there has been a tendency to minimize the importance of personal attributes in the selection and preparation of teachers. This could be an unfortunate oversight. While relatively little is known about the components of successful teaching performance, one can say with some degree of certainty that “. . . good teachers are friendly, cheerful, sympathetic, and morally virtuous . . .” (Getzels and Jackson, 1963, p. 574) The teacher’s personality is

of paramount importance as he interacts with his students in a variety of situations. Adaptability, creativity, and understanding are required of all teachers; the industrial arts teacher needs his full measure of these characteristics.

Flexibility is a necessity if the teacher is to accommodate the changing interests of his early adolescent charges while maintaining his enthusiasm for the subject at hand. The teacher must curtail his own interests at times in order to encourage his students to explore the full range of opportunities available to them in the laboratory and classroom. Creativity requirements for the successful industrial arts teacher are especially demanding. He must participate in the design of learning experiences as well as the planning of physical products. A significant portion of his efforts are devoted to the creation of order in the midst of chaos and to the evocation of an air of excitement when mundane activities must be completed.

The industrial arts teacher of the early adolescent needs a depth of understanding which is difficult of attainment. Students arrive in his classes with widely varying outlooks toward schooling. For many, the school has become an institution to be distrusted, and teachers are viewed as agents from an alien world. As Bel Kaufman notes, "Most fellows dislike their teacher not because the teacher is good or bad but because the teacher is a teacher." (1964, pp. 256-257) The teacher must cope with fear, arrogance, and disdain which cloak true feelings, yet nurture divergent interests and aptitudes. These demands can only be met by one with a sympathetic understanding of the needs of individual students.

### PROFESSIONAL COMPETENCIES

Frazier (1968) proposes three models of the teacher: specialist, executive, and professional. Even the elementary teacher who works in a self-contained classroom demonstrates some degree of specialization; the industrial arts teacher nearly always considers himself to be a specialist. The teacher-specialist serves as a member of an instructional team, even if there are no formalized provisions for "team teaching." He is also available as a consultant or resource teacher for his colleagues in other specialties. The teacher as an executive is responsible for the management of resources, leading instructional teams, and coordinating aides

and auxiliary personnel. As an executive, the teacher serves as manager, supervisor, organizer, and leader. The industrial arts teacher has unusually heavy executive responsibilities in most schools. Preservice and in-service experiences should be directed toward the development of the necessary executive competencies.

The teacher as a professional is a curriculum maker, an innovator, and a specialist in teaching methodologies. The importance of the industrial arts teacher's involvement in the development of the curriculum in his school has been indicated in earlier chapters, but deserves repetition here. The teacher is the critical link in the chain of curriculum development. He stands at the gateway to instruction and selects or designs the experiences he wishes to utilize in his courses. Professional magazines in industrial arts education have emphasized the innovative devices, organizational schemes, products, and processes developed by classroom industrial arts teachers for use in their programs.

As a professional, the industrial arts teacher must have a thorough understanding of the social phenomena which operate in his classes, in the school, and in the community. Industrial arts teachers tend to come from a relatively restricted range of social strata, with a high proportion of them having "working class" origins. A broader perspective of the diverse segments of society is required; this requires deliberate cultivation.

The industrial arts teacher must utilize sound psychological principles in designing learning experiences in the cognitive, affective, and psychomotor domains. Behaviorally-oriented goals are expected for almost all instructional activities; in addition, the teacher must design appropriate evaluation devices to assess educational attainment. Teachers must be alert to the identification and development of career-oriented interests without coercing the student into premature occupational commitments. Further, it is imperative that the industrial arts teacher be effective in working with students at all ability levels. Disadvantaged and handicapped students as well as academically talented youth demand his competent attention.

### **SUBJECT MATTER MASTERY**

Industrial arts teachers have traditionally been prepared to teach technically-oriented content. It is difficult to define adequate preparation for a teacher, either in general terms or by

enumerating specific competencies. However, prevailing practices have tended to reinforce the idea of the industrial arts teacher as a specialist in one technical area, capable of teaching advanced senior high school courses in the subject. Specialization has been encouraged by patterns of school organization and by some teacher certification requirements. Teachers have specialized interests, too, and like to develop them through concentrated teaching assignments.

Technical competence has been a frequent theme of recommendations for industrial arts teacher education. The innovative programs reviewed in the preceding chapter and the discussions in the earlier chapters, however, require a different perspective of subject matter mastery. Industrial arts teachers of early adolescents must be prepared to move in a much broader sphere of content than is included in a traditional, technically-based instruction program. Broad-range subject matter mastery is imperative for industrial arts teachers today. At the same time that many schools are expecting industrial arts teachers to operate skill-development programs in woods, metals, and drafting, other schools are demanding teachers who can participate effectively in unified arts programs.

In many instances, industrial arts is not perceived as a separate subject for study by early adolescents, but an integral part of a broader program. Whether the unity of subject matter extends across industrial arts and home economics, or whether it includes art, business, and other "practical arts," the inference is the same: industrial arts teachers must have a good grasp of a body of content outside their traditional realm. The disparity between preparation and expectation becomes even greater when educational experiences are designed to integrate instruction in industrial arts, social studies, and science, as described in one of the preceding reports. If such innovative efforts are indicators of probable future directions, the dilemma becomes acute. Breadth in subject matter preparation cannot be a complete substitute for the traditional depth in technical subjects; the contemporary industrial arts teacher needs both breadth and depth to be an effective, contributing professional in the variety of programs now in operation.

Occupational education has received relatively little attention in this volume. However, recent developments in career education imply the need for competencies in this area. Industrial arts

teachers have not yet been deeply involved in occupationally-oriented programs for the early adolescent, at least in most sections of the country. However, there is an implied expectation that an industrial arts teacher will have a good grasp of occupational opportunities in the industrial area, and can serve as a resource person for students exploring careers in industry. It is unlikely that the industrial arts teacher can develop adequate understandings from a limited variety of work experience, yet some degree of competence in career education is mandatory if one is to participate effectively in overall curriculum development in contemporary schools.

### IMPLICATIONS FOR TEACHER EDUCATION

Since the primary audience of the yearbook is comprised of industrial arts teacher educators, it seems almost redundant to suggest implications of the volume for their work. However, a few comments which have not been included elsewhere may be in order. These are related to the preservice experiences provided for prospective industrial arts teachers and to in-service activities for practitioners.

Prospective industrial arts teachers need much more comprehensive instruction on the problems of early adolescents and the design of educational experiences for them. Whether this can be done in existing courses, in new course offerings, or in a sequence of courses is a decision to be made by the teacher education faculty of the respective institution involved. It is inexcusable to assume that one teacher education program can prepare industrial arts teachers for all educational levels. The junior high schools and middle schools require teachers who understand the developmental level of the students and are anxious to work with them.

Preservice programs must provide the prospective teacher with the competencies to work with a variety of innovative approaches. Manufacturing activities, for example, are widely used in middle schools and junior high schools, and are related to many curriculum recommendations. Industrial arts teachers need long-term involvement in instructional settings where they can learn to implement individualized instruction, team teaching, and a variety of methodological approaches. It is unfair to expect graduates to be effective, professional practitioners without more breadth in their internship experiences. A long-term program of

planned, supervised internship activities is needed; it should incorporate a variety of courses at different educational levels for learners with differing characteristics. Such preparation would offer the graduate a sound base for the choice of his first professional position and increase his chances for success and satisfaction in his initial year of teaching.

Individuals who are now teaching industrial arts need in-service programs which will help them work with contemporary industrial arts approaches for the early adolescent. In many instances, workshops in the local community may be a highly effective way to encourage up-dating and the implementation of contemporary programs. For more comprehensive coverage, it may be appropriate to design graduate degree programs for those who wish to teach industrial arts to early adolescents. These programs could help teachers who have completed traditional teacher education curriculums orient themselves to the needs of the early adolescent and develop the competencies which were not acquired in their undergraduate programs.

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