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ABSTRACT

A competency-based educational project was done to develop an inventory of the competencies that beginning teachers of industrial arts education (K-12) in Pennsylvania must demonstrate to meet standards for satisfactory performance. Three regional workshops were held where the participants, selected by a steering committee using specific criteria, generated competency statements in four areas (industrial materials, power technology, visual communications, and industrial arts--professional) based on Pennsylvania's Generic 22 (a compilation of 22 statements delineating the general competencies needed by all teachers, regardless of grade level or subject area). Following these workshops, the steering committee synthesized and edited these competencies into a single set of statements. One hundred and twenty-five industrial arts teacher educators, supervisors, classroom teachers, and lay people attending an annual conference provided verbal and written feedback about the statements to the steering committee before the final editing was done. This booklet concludes with a complete list of the competency statements in the four areas and an appendix which includes Generic 22; an overview of project events, procedures, and dates; a list of the workshop participants and staff; and the criteria used for identifying competencies during the workshops. (EM)

Pennsylvania Competency-Based Teacher Education
COMPETENCIES: INDUSTRIAL ARTS EDUCATION
1977

Ronald L. Koble

Supported By:
Industrial Arts Association of Pennsylvania
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Publication of these competencies is not necessarily an endorsement by the Pennsylvania Department of Education, Industrial Arts Education Faculty at The Pennsylvania State University, or the Industrial Arts Association of Pennsylvania.

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The very nature of this project required the cooperative participation of many people. Notable contributions have been made by these groups: CBTE Project Steering Committee, Executive Board — Industrial Arts Association of Pennsylvania, Regional Vice Presidents — Industrial Arts Association of Pennsylvania, Regional Writing Workshop participants, Validation-Verification Session participants, and the Regional Writing Workshop consultants.

Special recognition is due to Gary Bowman, president (1975-76), Industrial Arts Association of Pennsylvania, for his early support of the project, and Matthew Bruce, CBTE consultant, who provided guidance and direction throughout the project. Special thanks are due to my colleague, John Shemick, who in addition to serving as workshop coordinator, offered valued suggestions and assistance throughout the project.

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Ronald L. Koble
January 15, 1977

INTRODUCTION

Viewed very broadly, competency-based education is one phase of a continuing effort to improve the process and product of education. Regardless of the long-term impact of competency-based education, its present effect on education, especially on teacher education, cannot be ignored. Overall, if educators can describe, with greater accuracy than in the past, the knowledge, skills, and attitudes that teachers need to perform competently, students will benefit.

PURPOSE

The primary purpose of this project was to develop an inventory of the competencies that beginning teachers of Industrial Arts Education K-12 must demonstrate in order to perform satisfactorily. Separate competency lists have been developed in the areas of Industrial Materials, Power Technology, Visual Communications, and Industrial Arts – Professional.

The competencies developed for Industrial Arts Education are compatible with but not redundant to the *Generic 22* (Appendix A), a compilation of twenty-two competency statements that delineate the general or generic competencies needed by all teachers, regardless of grade level or subject area. The development of the *Generic 22* was supported by the Pennsylvania Department of Education and published in 1974.

This project had two secondary outcomes. First, the approximately 250 people involved in the project developed some awareness of competency-based education. This project also demonstrated that it is possible to efficiently and effectively solicit the views of professional educators and other groups interested in contributing to the development of a professional field. In this instance, lay people, Industrial Arts educators, and other educators from all levels were represented in the decisions related to developing the competency statements, and in fact, all aspects of the project.

Guidelines

The following guidelines were used in the selection of project participants as well as in the development of the competency statements.

a. Participants should represent many geographic areas.
b. Participants should represent all of the content areas in Industrial Arts Education.
c. Participants should represent all instructional levels: elementary, middle, junior high and senior high schools, and colleges and universities.
d. Participants should represent a variety of sectors: comprehensive schools, administration, lay public, private schools, urban schools, rural schools, suburban schools, and different ethnic groups.
e. The selection of competencies should exemplify interlevel articulation, comprehensiveness, and interdisciplinary integration.
f. The competency inventory will reflect Industrial Arts Education as promulgated by the Pennsylvania Department of Education.

Procedures

An overview of the events and related procedures pertaining to the project, and the approximate dates of their occurrence, are shown in Appendix B.

Steering Committee

Recommendations for Steering Committee membership were made by the Executive Board of the Industrial Arts Association of Pennsylvania. The Steering Committee had three major responsibilities:

1. To make decisions related to conducting the project following the project proposal.
2. To identify the sites, and plan and conduct the Regional Writing Workshops.
3. To synthesize and edit the competencies generated at the three Regional Writing Workshops.

The Steering Committee met at University Park on the following dates.

Date	*Purpose*
April 14, 1976	Project Orientation, Plan Regional Writing Workshops
October 14-15, 1976	Synthesize and Edit Competencies
December 20, 1976	Edit Competencies

Workshops

Three Regional Writing Workshops were held to generate competency statements in each of the four areas — Industrial Materials, Power Technology, Visual Communications, and Industrial Arts – Professional.

Eastern Workshop	Cheyney, PA	May 15, 1976
Central Workshop	University Park, PA	May 15, 1976
West Workshop	Pittsburgh, PA	May 22, 1976

The participants in each of these workshops (Appendix C) were recommended by the regional vice presidents of the Industrial Arts Association of Pennsylvania. Guidelines for the selection of project participants previously discussed were used by the Steering Committee to select the workshop participants.

The schedule for each workshop was:

1. Introductions and Orientation to Competency-Based Education
2. Familiarization with Pennsylvania's *Generic 22* and "Criteria for Identifying Competencies" (Appendix D)
3. Discussion of sample competency statements
4. Participants, working in four subgroups, wrote competency statements
5. Report of competencies written by each subgroup to workshop participants

After the workshops, each participant received a copy of the statements drafted at the workshop in which they participated.

Editing and Validation-Verification

Following the three Regional Writing Workshops, the Steering Committee met to synthesize and edit the competencies drafted at these workshops into a single set of statements. During this process, duplicate statements were combined and other statements either were deleted or altered.

At the Annual Conference of the Industrial Arts Association of Pennsylvania, in November 1976, three one-hour Validation-Verification Sessions were scheduled. Approximately 125 Industrial Arts teacher educators, supervisors, classroom teachers, and lay people participated in these sessions and provided both verbal and written feedback pertaining to the competency statements. The information from the Validation-Verification Sessions was used by the Steering Committee in the final editing of the competencies.

COMPETENCIES OF TEACHERS OF INDUSTRIAL ARTS EDUCATION K-12

The purpose of this project was to identify the standards to be met by teachers of Industrial Arts Education K-12 in Pennsylvania. The competency statements are grouped into (1) Industrial Materials, (2) Power Technology, (3) Visual Communications, and (4) Industrial Arts – Professional. The first three groups represent the content areas for Industrial Arts Education in Pennsylvania. It is important to note that these competencies are based on and considered an extension of Pennsylvania's *Generic 22* (Craig, 1972).

These competencies must be considered as a whole; the individual statements if considered separately have little meaning. In addition, it is important to note that each teacher education institution using these competencies will need to establish the conditions under which they will be met as well as appropriate assessment techniques.

These competency statements are for Industrial Arts Education K-12. It is recognized that Industrial Arts Education at the elementary level (K-5) has unique characteristics, but not significantly different from those for grades 6-12. As a result, a separate list, or specific references to K-5 programs, is not included.

INDUSTRIAL ARTS - PROFESSIONAL: COMPETENCIES

IA-1 Industrial arts programs should provide students with learning experiences that will assist them in developing realistic career goals, becoming discriminating consumers, and utilizing industrial arts in avocational pursuits. Therefore, industrial arts teachers will demonstrate:

- 1.1 An awareness of the need for and knowledge of strategies to provide consumer-oriented experiences for students
- 1.2 A knowledge and awareness of the importance of strategies for establishing contact with community resources and utilizing them in the instructional program
- 1.3 A knowledge of careers related to the instructional areas in industrial arts
- 1.4 The ability to plan and provide pupil experiences that will lead to understanding the career opportunities available in industry
- 1.5 The ability to use materials, processes, and tools to assist students in the pursuit of avocational interests and career goals
- 1.6 Exemplary craftsmanship in their work and an appreciation for craftsmanship in the work of others

IA-2 Industrial arts programs are conducted in laboratory settings where safety, order, and maintenance are important. Therefore, the industrial arts teacher will demonstrate the ability to maintain a safe and orderly environment, including:

- 2.1 The use of sound management principles applied to tools, materials, and equipment as well as in the personnel aspect of program and class operation
- 2.2 The understanding and application of accepted safety standards
- 2.3 The understanding and application of accepted laboratory planning standards
- 2.4 The understanding of the legal aspects of the industrial arts teacher's role, especially concerning health, safety, and first aid in accident situations

IA-3 Industrial arts programs should provide a knowledge of the function of industrial systems and industrial organizations, as well as an awareness of the societal and environmental implications of technology. Therefore, the industrial arts teacher will demonstrate:

3.1 An understanding of the history of industry and technology

3.2 An understanding of the societal impact of technological developments

3.3 A knowledge of the types of industrial systems and organizations, and management functions

3.4 A knowledge of research and development, marketing, production planning, and production activities

IA-4 Industrial arts teachers are responsible for developing and implementing suitable programs of instruction for their assigned areas and/or grade levels and ability levels. Therefore, the industrial arts teacher will demonstrate:

4.1 The ability to analyze existing curricula in industrial arts and utilize appropriate components in the synthesis of functional curriculum and teaching plans to meet specific pupil and/or program needs

4.2 A knowledge of historical, contemporary, and exemplary industrial arts programs

INDUSTRIAL MATERIALS: COMPETENCIES

IA-5 Industrial arts deals with the use of materials, processes, and tools in a technological society. Therefore, the industrial arts teacher will be able to:

5.1 Demonstrate a knowledge of the historical, current, and projected future uses of materials

5.2 Demonstrate a knowledge of the physical and chemical characteristics of materials used in industry

5.3 Identify and select appropriate materials for specific applications, including forest products, metallics, plastics, ceramics, leather, textiles, and others

5.4 Demonstrate a knowledge of material sources and their primary processing

5.5 Demonstrate the safe operation of tools, machinery, and equipment used in the following industrial material processes:
- separating
- forming
- combining
- conditioning

5.6 Evaluate, organize, and implement different production techniques, such as mass, line, and custom

5.7 Apply principles of design in changing industrial materials to useful products

VISUAL COMMUNICATIONS: COMPETENCIES

IA-6 Industrial arts deals with the techniques of graphic visual communications and their utilization in a technological society. Therefore, the industrial arts teacher will be able to:

6.1 Demonstrate a knowledge of the historical, current, and projected future applications of visual communications

6.2 Demonstrate a knowledge of materials, processes, and equipment used in the areas of technical drawing, photography, and graphic arts

6.3 Safely operate tools, machinery, and equipment used in the area of visual communications

6.4 Demonstrate, evaluate, and utilize the following processes:
- planning
- layout and design
- image generation
- graphic reproduction
- finishing

POWER TECHNOLOGY: COMPETENCIES

IA-7 Industrial arts deals with the principles, technology, and utilization of energy in a technological society. Therefore, the industrial arts teacher will be able to:

- 7.1 Demonstrate a knowledge of the historical, current, and projected future applications of the principles of power
- 7.2 Demonstrate a knowlege of the sources of energy: geothermal, nuclear, solar, and mechanical
- 7.3 Explain the theory and demonstrate the operation of power-generating, transmission, and control systems
- 7.4 Demonstrate and evaluate energy-consuming devices
- 7.5 Apply accepted safety practices and principles which pertain to power generation, transmission, control, and utilization

REFERENCE

Craig, S. B., Jr. (Editor), *PA CBTE Handbook*, Harrisburg: Pennsylvania Department of Education, 1974.

APPENDIX A: THE GENERIC 22

Reference Number	Competency Statement
	I. The teacher will develop a position statement to serve as a basis for instructional goal setting and planning.
	A. The teacher will develop a set of convictions about the educational process which he/she can defend on the basis of theory.
R1	1. *The teacher will analyze educational issues and theories.*
R2	2. *The teacher will analyze the degree of congruence of his/her values with those of the community and the profession.*
R3	3. *The teacher will analyze the consistency of educational goals with his/her statement of convictions.*
R4	4. *The teacher will analyze educational practices for their consistency with his/her set of convictions.*
R5	5. *The teacher will evaluate and relate to teaching the results of research.*
R6	B. The teacher will develop educational goals.
R7	C. The teacher will plan and implement an instructional program.
	II. The teacher will personalize the teaching/learning process.
	A. The teacher will demonstrate respect for students.
R8	1. *The teacher will provide for student awareness of and respect for individual and cultural differences.*
R9	2. *The teacher will utilize value clarification techniques.*
R10	3. *The teacher will assess and utilize the unique characteristics of learners.*
R11	4. *The teacher will promote development of a healthy self-image in students.*

B. The teacher will understand and promote the natural development of individual differences among children.

R12 1. *The teacher will diagnose pupil needs and prescribe appropriate actions.*

R13 2. *The teacher will design instruction consistent with student achievement levels and learning styles.*

R14 3. *The teacher will evaluate teaching styles and instructional strategies.*

C. The teacher will create and maintain a physical and emotional environment which facilitates learning as a worthwhile activity.

R15 1. *The teacher will create an environment which promotes inquiry and process skills.*

R16 2. *The teacher will create an environment which supports the creative processes.*

R17 3. *The teacher will create an environment which maximizes the learning potential existing between the school and the community and the world.*

D. The teacher will select and utilize varied strategies to actively involve students in effecting instructional objectives.

R18 1. *The teacher will aid students in the selection, evaluation, and achievement of personal goals and objectives.*

R19 2. *The teacher will provide for students alternative procedures for meeting instructional objectives.*

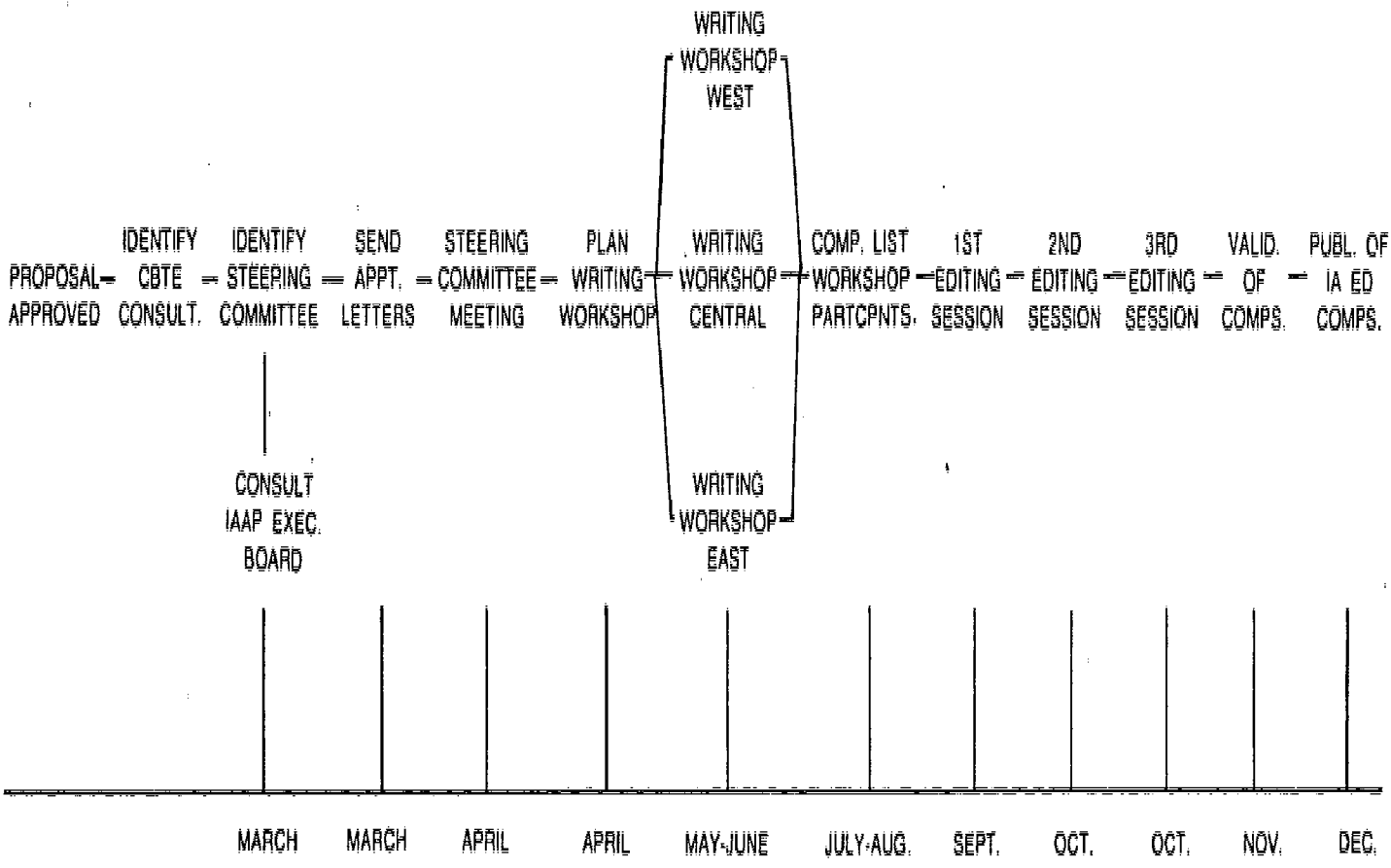
R20 3. *The teacher will select and utilize a variety of materials and resources to meet instructional objectives.*

R21 E. The teacher will use skills necessary for effective interaction with individuals and groups.

R22 III. The teacher will demonstrate the ability to speak and to write clearly the English language.

APPENDIX B

CBTE PROJECT — INDUSTRIAL ARTS EDUCATION



APPENDIX C

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APPENDIX D

CRITERIA FOR COMPETENCY STATEMENTS

Matthew W. Bruce

1. NEED	Is the competency identified in the statement *necessary* for the attainment of desirable pupil goals? OR Is the competency identified in the statement *necessary* for meeting other professional responsibilities?
2. LEVEL	Is the competency reasonably to be expected of entry level persons (i.e., persons entering the first year of teaching)?
3. ACQUISITION	Is the competency appropriate for development in the normal baccalaureate (or analogous) format? 3a. Is the acquisition reasonably generalizable; that is, does it reflect the *field* rather than the view of an individual or institution? 3b. Is the acquisition feasible in the light of available facilities and time allotments?
4. UNIQUENESS	Is the competency unique to the field (as opposed to those competencies that cut across all teaching fields), and is it, within the total inventory, not redundant?
5. PRACTICALITY	Is the competency accessible with reasonable instrumentation and with reasonable objectivity?
6. IDENTITY	Can the competency be identified as a part of one or another of the PDE generic competencies? Does it contribute to the development of experiences identifiable with the standards by which programs in the field will be evaluated?