https://doi.org/10.21061/jte.v2i2.a.6

# Technology Teacher Education Curriculum Courses

Karen F. Zuga

As the shift from industrial arts to technology education takes place, there is a tendency to merely change the name of a course and not to change the course content. In order to make the change to a technology education curriculum teachers need to be able to conceptualize and design new courses.

One of the intervention strategies for increasing the likelihood of renewal and improvement in technology education has been through teacher education programs and curriculum courses for preservice technology teachers. Most preservice teachers study curriculum development with respect to industrial arts/technology education, yet, evidence of what they study about curriculum is lacking.

Although recent publications in the field of curriculum have focused on the variety of ways in which educators design curriculum (Eisner, 1979; Eisner & Vallance, 1974; Joyce, 1980; McNeil, 1977; Ornstein & Hunkins, 1988; Saylor, Alexander, & Lewis, 1981; Schubert, 1986; Wiles & Bondi, 1984), few have examined the ways in which technology educators design curriculum or teach preservice teachers to design curriculum. The literature of the field reveals few studies of what is actually taught to future technology teachers in curriculum planning courses. How teachers are taught to plan curriculum may very well influence their ability to implement curriculum change in technology education.

Informal discussions with practicing teachers often reveal difficulties and guilt associated with designing curriculum. The difficulties and guilt stem from an inability to implement the kind of curriculum design process which was taught in the preservice program. Recently, a teacher working with this project revealed that during a departmental meeting his colleagues decided that they wrote curriculum with a "backwards" approach since their curriculum planning practices did not resemble what had been taught to them in their preservice courses. This very practical problem, and the lack of knowledge concerning contemporary curriculum courses, brings up the question, what is being taught to preservice technology education teachers about curriculum planning?

---

Karen Zuga is Assistant Professor, Industrial Technology Education Department, The Ohio State University, Columbus, Ohio. This project was the result of a grant from the Office of Vocational and Adult Education, U. S. Department of Education. However, the opinions expressed herein do not necessarily reflect the position or policy of the U. S. Department of Education, and no official endorsement by the U. S. Department of Education should be inferred.

https://doi.org/10.21061/jte.v2i2.a.6

## Objectives and Questions of the Study

Based upon the very real problem that teachers have with curriculum design I sought to identify and describe some of the practices and goals of technology teacher education curriculum courses. Since research can be a tool for change I hope that this study supports a dialog about the role and responsibility of teacher educators with respect to changing curriculum practices in the field. Based on these objectives, the following questions guided the study:

1. What is the context of curriculum courses for preservice technology teachers?
2. What is the content and practice (as described by teacher educators) of curriculum courses for preservice technology teachers?
3. What curriculum course goals do teacher educators prefer?

## Methods

As a primarily descriptive exercise, I employed a survey in order to collect data and information about preservice curriculum courses in technology teacher education. The survey included a combination of forced-choice and open-ended questions. Although the open-ended questions were thought to be difficult and did turn out to cause some response problems, open-ended questions were chosen in order to avoid researcher bias by preliminary categorization of concepts.

The survey was sent to the population of 214 department chairpersons identified in the 1988-1989 *Industrial Teacher Education Directory* which could have a teacher education program in technology education. The response rate to the survey was 51% or 109 responses. In addition it should be noted that 23% of the returned surveys were not potentially useful due to a lack of a technology teacher education program at the institution, a phenomenon which could have influenced the number of returned responses. The number of potentially useful surveys was further reduced by the courses offered within the teacher education programs. Of the 84 surveys returned with a teacher education program indicated, only 59 (70% of the useful surveys) of the programs included curriculum courses. The other programs either included a combined methods and curriculum course or required no curriculum courses. The objective of the study was to identify curriculum practices and beliefs of technology teacher educators, therefore, I chose to analyze only the surveys from the 59 programs that included a curriculum course.

Since I was conducting the study for a preliminary description of practices in technology teacher education curriculum courses and to identify as many practices as possible, the data are minimally reduced into categories in this report. I decided to limit the categorization in order to provide the reader with as much evidence as practical so that the reader could use the data for the purpose of agreeing or disagreeing with interpretation in this paper and to maintain fidelity to the concepts of the respondents.

https://doi.org/10.21061/jte.v2i2.a.6

## Results

Based on the questions posed for the study three categories of information are reported. These three categories include information about the curriculum courses offered, practices in the curriculum courses, and teacher educators' attitudes about curriculum design.

*Course Description*

Information about the curriculum courses offered was obtained in order to briefly describe the context of the curriculum courses so that some understanding of the participants and programs could be conveyed. Therefore, questions about the program name, courses offered, length of courses, credits, and students in the courses were asked.

Of the surveyed program areas that offered curriculum courses for and certified technology education teachers, 34% of the programs were listed as technology education programs. The remaining programs used a wide variety of titles which could be grouped in the following categories: industrial education (20%), industrial technology/education (15%), industrial arts/education (15%), industrial science/studies/etc. (12%), and vocational-technical education (2%). Further condensing of the categories into one that includes all programs using the modifier "industrial" in the title reveals that 62% of the programs are designated as some form of industrial study.

Most of the programs (56%, n=33) offered one curriculum course. Two courses were offered in 31% (n=18 )of the programs and the remaining programs offered three or more courses. Course length was determined by the quarter and semester system with 56% (n=33) of the programs offered in the semester system. Most of the courses (70%, n=41) were offered as three credits with the remaining courses offered in a range of two to six credits. Forty-two percent of the courses were taught

https://doi.org/10.21061/jte.v2i2.a.6

**Table 1**
*Program Titles*

| Title | n | % |
|---|---|---|
| Technology Education | 20 | 34 |
| Industrial Education | 12 | 20 |
| Industrial Technology/Education | 9 | 15 |
| Industrial Arts/Education | 9 | 15 |
| Industrial Science/Studies/Etc. | 7 | 12 |
| Vocational-Technical Education | 1 | 2 |
| Missing | 1 | 2 |

within the technology teacher education program area, 34% of the courses were taught within the department, two percent of the courses were taught within the college, and 22% of the courses were taught by a combination of program, department, and college faculty.

**Table 2**
*Administrative Unit Responsible for Teaching Curriculum Courses*

| Administrative Unit | n | % |
|---|---|---|
| Program Area | 25 | 42 |
| Department | 20 | 34 |
| Combination (Program Area and Department) | 13 | 22 |
| College | 1 | 2 |

Student enrollment in the curriculum courses by major was a particularly interesting question which related directly to the impetus for the study. Recent trends of low student enrollment in technology education, an historical association with vocational education, and the distribution of responsibility for teaching curriculum courses prompted a question about the majors of the students enrolled in curriculum courses. A little over half of the curriculum courses (56%, n=33) were offered exclusively to technology education majors. In the remaining courses a combination of vocational education, training, and general education students were also in the same courses. Vocational education majors were the most frequent students to be combined with technology education students with 39% (n=23) of the classes enrolling both vocational education and technology education majors. Training majors were in 15% (n=9) of the courses and only two percent of the courses enrolled general education majors.

https://doi.org/10.21061/jte.v2i2.a.6

*Course Practices*

Analysis of the practices within curriculum courses focused on the assigned texts and materials, course goals, course topics, and student assignments. All of this information was elicited with open-ended questions.

*Course texts and materials*. Table 3 presents an overview of the types of materials and texts used in technology teacher education curriculum courses.

**Table 3**
*Format of Course Materials*

| Material | n | % |
|---|---|---|
| Textbooks | 55 | 93 |
| Selected Readings and Handouts | 20 | 34 |
| Curriculum Guides | 14 | 24 |
| Vendors' Catalogs | 01 | 01 |
| No Response | 01 | 01 |

* Columns will not total to 59 or 100% due to the use of several formats in one course

The most frequently used materials were texts. Selected readings and national, state, and local curriculum guides followed in frequency of use. Because texts can play an important role in defining a curriculum perspective, the titles and content of the texts were analyzed in order to identify the primary audience for the book. The majority of the texts were written for industrial education audiences and included information about curriculum development for vocational educators and industrial trainers. Representative texts in each category, with the frequency of use included, are shown in Table 3A.

**Table 3A**
*Selected Examples of Textbook Used in Curriculum Courses*

| Textbook | n |
|---|---|
| **Industrial Education** | |
| Giachino, J. W., & Gallington, R. O. (1961). *Course construction in industrial arts and vocational education*. Chicago: American Technical Society. | 6 |
| Miller, W. R., & Rose, H. C. (1975). *Instructors and their jobs*. Chicago: American Technical Society. | 5 |
| Bartel, C. R. (1976). *Instructional analysis and materials development*. Chicago: American Technical Society. | 4 |
| Andrews, R. C., & Ericson, E. E. (1976). *Teaching industrial education: Principles and practices*. Peoria, IL: C. A. Bennett. | 3 |

https://doi.org/10.21061/jte.v2i2.a.6

***Table 3A (cont.)***

| | |
|---|---|
| Finch, C. R., & Crunkilton, J. R. (1979). *Curriculum development in vocational and technical education: Planning, content, and implementation.* Boston: Allyn & Bacon. | 3 |
| Paulter, A. (1978). *Teaching technical subjects in education and industry*. | 2 |
| Silvius, G. H., & Bohn, R. C. (1976). *Planning and organizing instruction*. Bloomington, IL: McKnight. | 2 |
| Bott, P. A. (1987). *Teaching your occupation to others: A guide to surviving your first year*. Elmsford, NY: National. | 2 |
| Baird, R. J. (1972). *Contemporary industrial teaching: Solving everyday problems*. South Holland, IL: Goodheart-Willcox. | 1 |
| Center on Education and Training (1989). *Performance based teacher education module series*. Athens, GA: American Association for Training and Employment. | 1 |
| Bollinger, E. W., & Weaver, G. G. (1955). *Trade analysis and course organization for shop teachers*. New York: Pitman. | 1 |
| Fryklund, V. C. (1965). *Analysis techniques for instructors*. Milwaukee, WI: Bruce. | 1 |
| Mager, R. F., & Beach, K. M. (1967). *Developing vocational instruction*. Fearon. | 1 |
| McMahon, G. G. (1972). *Curriculum development in trade and industrial and technical education*. Columbus, OH: Merrill. | 1 |
| **Industrial Arts/Technology Education** | |
| Unspecified ACIATE/CTTE Yearbooks | 5 |
| Technical Foundation of America. (undated). *Industry and technology education: A guide for curriculum designers, implementors, and teachers*. | 3 |
| American Industrial Arts Association (1985). *Standards for technology education programs*. South Holland, IL: Goodheart-Willcox. | 1 |
| Kemp, W. H., & Schwaller, A. E. (Eds.) (1988). *Instructional strategies for technology education*. Bloomington, IL: McKnight. | 1 |
| Maley, D. (1973). *The Maryland plan*. New York: Bruce. | 1 |
| Maley, D. (1978). *The industrial arts teacher's handbook: Techniques, principles, and methods*. Boston: Allyn & Bacon. | 1 |
| Martin, G. E. (1979). *Industrial arts education: Retrospect, prospect*. Bloomington, IL: McKnight. | 1 |
| Snyder, J. F., & Hales, J. A. (1981). *Jackson's Mill industrial arts curriculum theory*. Charleston, WV: West Virginia State Department of Education. | 1 |
| **General Education** | |
| Mager, R. F. (1984). *Preparing instructional objectives*. Belmont, CA: Lake Management & Training. | 3 |
| Kim, E. C., & Kellough, R. D. (1983). *A resource guide for secondary school teaching: Planning for competence*. New York: Macmillan. | 1 |
| Oliva, P. F. (1982). *Developing the curriculum*. Boston: Little, Brown. | 1 |
| Orlich, D. C. et al. (1985). *Teaching strategies: A guide to better instruction*. Lexington, MA: Heath. | 1 |
| Wulf, K., & Schave, B. (1984). *Curriculum design: A handbook for educators*. Glenview, IL: Scott, Foresman. | |
| State of Ohio. *Course of study development: A process model*. Columbus, OH: Ohio Department of Education. | 1 |

https://doi.org/10.21061/jte.v2i2.a.6

Of the technology education texts listed, few could be classified as curriculum textbooks as contrasted with either industrial education or general education texts. This may be due to the lack of curriculum textbooks for the small technology teacher education market. The use of the ACIATE/CTTE yearbook series appears to attempt to remedy this.

**Table 4**
*Curriculum Course Goals*

| Goal | n* | %* |
|---|---|---|
| Develop a course of study, course materials, sequence of content | 37 | 63 |
| Know the procedures of content selection or analysis of subject matter | 30 | 51 |
| Know the relationship of philosophy to objectives | 21 | 36 |
| Formulate objectives or outcomes | 10 | 17 |
| Determine the needs of students | 7 | 12 |
| Evaluate courses | 6 | 10 |
| Present materials | 4 | 7 |
| Analyze materials | 3 | 5 |
| Prepare for first year of teaching | 2 | 3 |
| Reconstruct and improve a way of life | 2 | 3 |
| Integrate subject matter | 2 | 3 |
| Understand taxonomies | 2 | 3 |
| Transmit the cultural heritage | 1 | 2 |
| Describe difficulties of curriculum change | 1 | 2 |
| Use problem solving and inquiry | 1 | 2 |
| Promote leadership and professionalism | 1 | 2 |
| Know state requirements | 1 | 2 |
| Plan facilities | 1 | 2 |

* Columns will not total to 59 or 100% due to use of several types of goals in each course

*Course goals*. Respondents were asked to list the three most important curriculum course goals. A varying number of goals were reported by each respondent. Seven of the surveys did not have this information. The primary goals found in technology teacher education curriculum courses as reported in Table 4 are to select content and to develop courses.

*Course topics*. Course topics are reported here in Table 5 as a frequency list that is rank ordered. The topics in technology teacher education curriculum courses focus on analyzing and selecting course content and appear to be related to the course goals.

**Table 5**

https://doi.org/10.21061/jte.v2i2.a.6

*Course Topics*

| Topic | n* | %* |
|---|---|---|
| Selecting and organizing content, knowledge, learning, etc. | 53 | 90 |
| Philosophy and goals | 36 | 61 |
| Structure of knowledge | 36 | 61 |
| Program and student evaluation | 23 | 39 |
| Formulating objectives | 22 | 37 |
| Procedures, such as teaching methods, discipline, text selection, etc. | 19 | 32 |
| Organization, management, and supervision | 10 | 15 |
| Social foundations | 7 | 12 |
| Occupational/task analysis | 5 | 8 |
| Professionalism | 4 | 7 |
| Resources | 4 | 7 |
| Research | 2 | 5 |
| Change | 2 | 5 |
| Teacher certification testing | 2 | 5 |

* Columns will not total 59 or 100% due to use of several topics in each course

*Student assignments*. To complete the description of the activities within the courses as reported by the respondents, types of student assignments with the frequency of use are listed in Table 6.

Course goals, topics, and student assignment lists and frequencies appear to be related, demonstrating some unity of purpose and execution.

## Teacher Educators' Attitudes

Two questions which assessed teacher educators' attitudes about curriculum courses were asked. The definition of curriculum used in the course was requested as a means of identifying beliefs about curriculum and a rating scale was used to indicate what topics would be important in a curriculum course.

*Curriculum definitions*. Respondents were asked to list the definition of curriculum that was used in the course. Of the surveys returned, 48 respondents answered this question. Each definition was categorized to fit into one of five major views of curriculum. A few respondents included more than one definition which they used for the purpose of comparison. The major emphases of definitions are reported in Table 7

https://doi.org/10.21061/jte.v2i2.a.6

**Table 6**
*Student Assignment*

| Assignment | n* | %* |
|---|---|---|
| Develop a course | 34 | 58 |
| Develop lesson plans and instructional materials | 25 | 42 |
| Write performance objectives | 18 | 31 |
| Study foundations, philosophy, etc. | 12 | 20 |
| Create an evaluation plan | 8 | 14 |
| Evaluate a course | 7 | 12 |
| Perform a task analysis | 7 | 12 |
| Reading and research | 6 | 10 |
| Perform a needs assessment | 2 | 3 |
| Teach | 2 | 3 |
| Develop a program for a school | 2 | 3 |
| Create a concept map | 1 | 2 |
| Define curriculum | 1 | 2 |
| Study methods | 1 | 2 |
| Write a career intent paper | 1 | 2 |
| Plan for an advisory committee | 1 | 2 |
| Create a planning guide for a unit | 1 | 2 |
| Take field trips to school laboratories | 1 | 2 |
| Select equipment and materials | 1 | 2 |

* Columns will not total 59 or 100% due to use of several types of assignments

**Table 7**
*Composite Curriculum Definitions Used*

| Definition | n | % |
|---|---|---|
| The process of arranging content for the purpose of teaching | 21 | 36 |
| A course of study involving arrangement of subject matter | 18 | 31 |
| All of the activities of the school in which students are engaged | 4 | 7 |
| There are several definitions used for the purpose of comparison | 3 | 5 |
| Analysis of community needs, subject matter, and the environment | 2 | 3 |
| Missing | 11 | 17 |

https://doi.org/10.21061/jte.v2i2.a.6

The definitions of curriculum used in the technology teacher education curriculum courses reflect the pattern which evolved in the lists of course goals, topics, and student assignment.

*Content focus*. The respondents were asked to indicate, on a simple rating scale, agreement or disagreement with several statements about the focus of curriculum courses for technology education majors. A four-point scale was used with a rating of one representing the greatest amount of agreement. The content foci of curriculum courses, rank ordered by mean rating of agreement, are presented in Table 8.

**Table 8**
*Teacher Educators' Attitudes About Content Foci for Curriculum Courses*

| Focus | mean | sd |
|---|---|---|
| Plan activities based upon critical thinking and problem solving skills | 1.10 | .42 |
| Identify and organize subject matter concepts for course outlines and lessons | 1.14 | .54 |
| Write performance objectives | 1.37 | .72 |
| Plan activities which engage learners in socially relevant projects | 1.54 | .77 |
| Perform systems analysis | 1.65 | .81 |
| Work with each learner in order to identify and integrate personal interests | 1.73 | .82 |
| Create taxonomies of subject matter | 1.97 | 1.11 |
| Perform job and task analysis | 2.11 | 1.20 |

Some variation in the pattern of identifying and organizing subject matter as the major emphasis in curriculum courses appears in the survey of teacher education attitudes. For example, planning activities based upon critical thinking and problem solving skills did not appear as the major emphasis in previous tables.

## Discussion

As an initial survey of technology teacher education curriculum course practices the data presented here can initiate a discussion about the process of preparing teachers. Certainly, the information could be useful for the planning of curriculum courses for preservice technology teachers.

At present, it appears as though the majority of the respondents teach with similar goals, topics, and student assignments. In the majority of the cases these goals, topics, and student assignments form a pattern of content which focuses on selection of content and course development. Due to this focus, the majority of the courses appear to be very technical in nature. By technical I mean that the processes of analyzing, selecting, and organizing content take precedence over the broad philosophical questions about what knowledge is of most value (Cherryholmes, 1988). In addition, goals such as integrating subject

https://doi.org/10.21061/jte.v2i2.a.6

matter, understanding taxonomies, and reconstructing and improving a way of life (which may relate to addressing the general education nature of technology education and topics such as studying foundations, reading, and research), and creating a concept map (which may enable technology teachers to design curriculum for general education purposes) are not listed as frequently as the technical activities pertaining to course development.

There are other disturbing trends in the information about the context of the courses and the materials and textbooks which are used. Over 54% of the textbooks used are designed primarily for industrial education and 44% of the courses were offered for a combination of technology, vocational, and training majors. Vocational educators and trainers have a clear mission of identifying the essential tasks of a job or trade, organizing those tasks for instruction, and doing their best to prepare their students to be competent on a job. Given that task, vocational educators and trainers have developed some of the most sophisticated systems for creating curriculum, and their curriculum planning processes are effective for their purposes. One has to question, however, if these same systems are effective for technology education (Lux, 1979). Why would a technology educator who wishes to deal with a broad array of general education goals want to use a curriculum planning process that is designed to effectively and efficiently identify course content aimed at preparing students to meet occupational requirements? Over half of the textbooks listed on the survey are designed for industrial education and include curriculum planning processes for vocational educators and trainers.

Moreover, the age of the industrial education texts is questionable. The publication dates on texts used and reported by respondents range from 1955 to 1979. One might say that the process of identifying appropriate curriculum was as valid in 1955 as it is today, but current literature about curriculum, especially curriculum for general education, cannot be included in texts from the 1950s.

Those who do not use texts designed for industrial education have chosen to use either general educational texts or a range of books which provide examples for technology education or deal with technology education issues. The very real problem is that there is a lack of books about technology teacher education topics such as curriculum design. The response by a few teacher educators may have been to forgo the vocational oriented texts in favor of selected reading, teacher made materials, and state department documents.

Adding to the frustration of not having adequate texts, is the very real financial exigency that forces teacher education programs to place both technology education majors with trade and industry majors and training majors in curriculum development courses. Each target population has different curriculum design concerns starting with the fact that they deal with different student populations in their respective schools and organizations and have different purposes when teaching those students. A potential outcome of this practice is confusion and dissatisfaction for the prospective teacher. A course taught with an even allocation of information for each group may result in a loss of

https://doi.org/10.21061/jte.v2i2.a.6

time devoted to the teacher education majors' primary interests and in hearing much useless or confusing information which is not relevant to future teaching practice.

In addition to the need to question curriculum course practices and texts is the discrepancy in teacher educators attitudes about the content focus of curriculum courses. While the majority of teacher educators responding to the survey indicated that the processes of arranging content and a course of study were the definition of curriculum that they used, the content focus for curriculum courses which had the most agreement among respondents was planning activities based upon critical thinking and problem solving skills. The majority of goals, topics, and student activities listed in the survey did not relate to this focus. In a sense, the focus on planning activities validates the “backwards” approach that concerned the teacher who assisted in the project. Perhaps, technology teacher educators are providing mixed messages to preservice teachers through their attitudes.

## Summary

While a coherent pattern of goals, topics, and student assignments appear to exist in technology teacher education courses this pattern reveals a technical orientation to developing curriculum. Combined with the persistent influence of vocational purpose through texts and the practice of grouping industrial education students majoring in technology education, vocational education, and training into curriculum courses, preservice technology teachers may be getting a confusing message, at best, about appropriate curriculum design processes for technology education.

This study of technology teacher education curriculum courses reveals the following points:

1. Curriculum instruction in technology teacher education has a limited (and often no) number of goals for the study of curriculum.
2. The age of the curriculum texts in use (as reported by the respondents) dates the information.
3. Industrial education books which are based in vocational education curriculum planning methods are predominant.
4. The practice of combining technology education majors with industrial education majors predominates.

Due to the low return of the survey recommendations for action would be questionable; further study is needed. However, the preliminary results need not stop those who are providing technology teacher certification programs from examining their own practices. They should consider the long term effects on technology education reform of combining dissimilar majors, the quality and recency of the texts, and their own curriculum knowledge base. In order to revise technology education, technology teachers must have the best possible information.

https://doi.org/10.21061/jte.v2i2.a.6

## References

Cherryholmes, C. H. (1988). *Power and criticism: Poststructural investigations in education*. New York: Teachers' College.

Eisner, E. W. (1979). *The educational imagination*. New York: Macmillan.

Eisner, E. W., & Vallance, E. (1974). *Conflicting conceptions of curriculum*. Berkeley, CA: McCutchan.

Joyce, B. R. (1980). Learning how to learn. *Theory and Practice*, *19*(1), 15-27.

Lux, D. G. (1979). Trade and job analysis--- The scourge of i.a. *School Shop*, *38*(7), 2.

McNeil, J. D. (1977). *Curriculum: A comprehensive introduction*. Boston: Little-Brown.

Ornstein, A. C., & Hunkins, F. P. (1988). *Curriculum: Foundations, principles, and issues*. Englewood Cliffs, NJ: Prentice-Hall.

Saylor, J. G., Alexander, W. M., & Lewis, A. J. (1981). *Curriculum planning: For better teaching and learning*. New York: Holt, Rinehart, & Winston.

Schubert, W. H. (1986). *Curriculum: Perspective, paradigm, and possibility*. New York: Macmillan.

Wiles, J., & Bondi, J. C. (1984). *Curriculum development: A guide to practice*. Columbus, OH: Bell & Howell.