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**A NEEDS ASSESSMENT STUDY
OF TECHNOLOGY EDUCATION
TEACHERS IN VIRGINIA**

**A Research Paper
Presented to the Graduate Faculty of
the Department of Occupational and Technical Studies
at Old Dominion University**

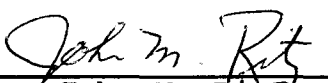
**In Partial Fulfillment
of the Requirements for the
Master of Science in Education Degree**

**By
James L. Kennedy
August 1993**

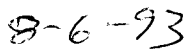
APPROVAL PAGE

This research paper was prepared by James L. Kennedy under the direction of Dr. John M. Ritz in OTED 636, Problems in Education. It was submitted to the Graduate Program Director as partial fulfillment of the requirements for the Degree of Master of Science of Education.

APPROVAL BY:



Dr. John M. Ritz
Advisor and Graduate
Program Director



Date

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James L. Kennedy

TABLE OF CONTENTS

	PAGE
Approval Page	i
Acknowledgements	ii
Table of Tables	v
Table of Figures	vi
Chapter	
I. INTRODUCTION	1
Statement of the Problem	1
Research Goals	2
Background and Significance	2
Limitations	4
Assumptions	4
Procedures	4
Definition of Terms	5
Summary and Overview	5
II. REVIEW OF LITERATURE	7
Professional Development	7
Summary	10
III. METHODS AND PROCEDURES	12
Population	12
Instrument Design	12
Methods of Data Collection	14
Methods of Statistical Analysis	14

Summary	14
IV. FINDINGS	16
Demographic Profile	16
Educational Services	20
Professional Development	21
Summary	25
V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS ..	26
Summary	26
Conclusions	27
Recommendations	31
BIBLIOGRAPHY	34
APPENDICES	35
Appendix A. Sample of Survey Questionnaire	36
Appendix B. Sample of the Follow-up Letter	43
Appendix C. Knowledge Ranking of Content and Methods Areas	45
Appendix D. Interest Ranking of Content and Methods Areas.....	48

TABLE OF TABLES

	PAGE
TABLE 1. TECHNOLOGY TEACHERS BY REGION	17
TABLE 2. HIGHEST DEGREE EARNED	17
TABLE 3. INSTRUCTION LEVEL	18
TABLE 4. AGE OF TECHNOLOGY TEACHERS	18
TABLE 5. NUMBER OF YEARS TAUGHT	19
TABLE 6. MAXIMUM YEARS FOR RETIREMENT	20
TABLE 7. ATTENDANCE OF SPONSORED WORKSHOP	20
TABLE 8. SUFFICIENCY OF VIRGINIA'S GRADUATE PROGRAMS ..	21

TABLE OF FIGURES

PAGE

FIGURE 1. COURSE RANKING BY INTEREST 23

CHAPTER I
INTRODUCTION

In March 1990, President Bush and the nation's fifty governors established six national education goals for the United States to reach by the year 2000. These six goals ranged from improving the graduation rate to developing all students in order to allow them to be able to compete in a global economy. With these goals in the view of the American people, technology education has the opportunity to become an integral part of fundamental education.

With the growth of technology education, several new or revised curricula have been developed. These curricula have been developed to improve the type of education the students are receiving in the area of technology education. The objectives of technology education are geared to a holistic approach to education in order to produce the quality of the future workforce required for competition in a global economy addressed by President Bush.

STATEMENT OF THE PROBLEM

The purpose of this study was to determine the technical, philosophical and methodological needs of Virginia technology education teachers for professional

development.

RESEARCH GOALS

With the purpose of determining the needs of technology education teachers, this study was developed with four goals in mind. They were:

- 1) to determine the need by the teachers to understand the philosophy of the current curriculum;
- 2) to determine the need to understand the methodology used by the current curriculum;
- 3) to determine the equipment operation needs by the technology teachers implementing the technology education curriculum;
- 4) to develop recommendations for inservice programs to meet the determined needs of the technology education teachers.

BACKGROUND AND SIGNIFICANCE

AMERICA 2000 was a statement from President Bush and the state's governors reinforcing the need to improve the American education system. In order for the United States to remain as a competitor in a global economy, our education system must produce graduates who possess higher level skills. The SCANS report was a statement from American industries to the American education system identifying the needs of workers in the future. According

to the SCANS report, the future workers need to be able to use:

1. Resources - allocating time, money, materials, space and staff;
2. Interpersonal skills - working on teams, serving customers, leading, negotiating, and working well with people from culturally diverse backgrounds;
3. Information - acquiring and evaluating data, organizing and maintaining files, interpreting and communicating, and using computers to process information;
4. Systems - understanding social, organizational, and technological systems, monitoring and correcting performance, and designing or improving system; and
5. Technology - selecting equipment and tools, applying technology to specific tasks, and maintaining and troubleshooting technologies (Ritz, 1992).

Technology education in Virginia exposes students to these desired characteristics through several program areas, such as production technology, communication technology, control technology, principles of technology and pre-engineering. With the recent development of these program areas, many have not been implemented into a large number of institutions. One reason for the programs not being implemented as Wilkinson (1990, p. 64) summarized, the people (classroom teachers) in the trenches do not have the financial resources or the "practical" guidance of teacher educators to help them bridge the gap. In order for technology education programs to continue to grow, teachers who desire to change their courses from an industrial arts

focus towards a technology education focus need to be informed about the new curriculum and methodology of the proposed programs.

LIMITATIONS

The following limitations were found in this study.

- 1) The population of this study was limited to technology education teachers, teacher educators and supervisors.
- 2) The population of this study was current technology education teachers from the whole state of Virginia.

ASSUMPTIONS

The results of this study were based on the following assumptions.

- 1) The teachers and supervisors surveyed had a desire to improve their technology education programs.
- 2) The teachers and supervisors had a basic knowledge of the current curriculum for technology education.

PROCEDURES

In order to conduct this study appropriately, first the researcher needed to identify the technology teachers and supervisors in the state of Virginia who were involved

with a technology education program. Then, develop, distribute and collect a survey to analyze the opinions of the population. After collecting the data, the researcher developed recommendations for an inservice education program to aid the implementation/improvement of the current curriculum for technology education.

DEFINITION OF TERMS

The following terms were used within this study which may have multiple or special meanings. To ensure the appropriate understanding of each term, refer to the following definitions.

1. CAD/CAM - Computer-aided Design/Computer-aided Manufacturing
2. CAGS - Certificate of Advanced General Studies
3. Industrial Arts - exploring and understanding industrial applications.
4. SCANS - Secretary of Labor's Commission on Achieving Needed Skills
5. Technology Education (TE) - area of technology which is broad based and includes the study of industrial, agricultural, informational, etc. technologies.
6. VTEA - Virginia Technology Education Association.

SUMMARY AND OVERVIEW

The SCANS report and AMERICA 2000 have created a

demand for improvement in the American education system. With the emphasis on math and science academia, communication skills, and problem solving abilities, technology education plays an integral part in the future success of the nation.

Since the programs of technology education are in the infancy stage, many of them have not been widely implemented. The technology teachers who are interested either in improving or implementing them need to have professional guidance from the teacher educators. The intent of the study was to determine the needs of the technology teachers to understand the curriculum and the methodology pertaining of their program areas. Also, the study needed to discover the equipment operating needs for teachers to implement or improve the technology education program. After determining the needs of the teachers, recommendations for inservice education to assist technology education teachers in implementing or improving a technology education program had been developed.

The information of this study was organized into five chapters. Chapter I contains an introduction into the parameters of the study. A review of the literature related to the study is found in Chapter II. In Chapter III, a presentation of the study's procedures and methods used is shown. Chapter IV contains the findings of the survey used in the study. To conclude the study, Chapter V summarizes the study's results and recommendations.

CHAPTER II

REVIEW OF LITERATURE

This chapter will explore the information related to professional development for technology education teachers. The areas of professional development that were considered were the technical, philosophical and methodological needs of the technology education teachers.

PROFESSIONAL DEVELOPMENT

Technical Aspect

The technical aspect of professional development refers to the actual skill of performing a task. With the advancement in new technologies, it is extremely difficult for an instructor to continually maintain the level of knowledge needed to remain current with the field without some type of continuing education. Depending on the actual course taught in the classroom, there could be numerous areas needed to be covered. Such as the aspect of professional development, which was one area that would be specifically developed based on areas of interest to the population.

Philosophical Aspect

The next aspect of professional development was the philosophical aspect. The philosophy of technology

education has been established as basically instructing the students about the technological society which will continue to impact their lives. They must be taught how to live and manage technology without becoming enslaved by it (Braukmann and Pedras, 1990).

Methodological Aspect

The methodological aspect deals with how the information of the course is presented. With the current philosophy of technology education, many educators fall short on the area of methodology because they teach how they were taught. The instructors were developed by teacher education programs that taught them to become technicians by focusing on tool skills and technical knowledge. This theory was supported by the seventh annual survey of technology education and trade and industrial education programs conducted by Dugger, French, Peckman and Starkweather (1992). According to the survey, general technology education courses ranked sixth in the order of course listings with woodworking, drafting, architectural drafting, general metals, and mechanical drawing preceding them. Unfortunately, the first five courses being listed in technology education programs were remnants from the old industrial arts programs. Do these courses fit into the goals and objectives of technology education which is defined as follows?

"a comprehensive, action-based educational program concerned with technical means, their

evolution, utilization, and significance; with its organization, personnel systems, techniques, resources and products; and their sociocultural impact" (AIAA, 1985, p. 25).

If technology education is going to become a new basic in education, can it contain the courses that stress solely technical skills? The new professionals believe they need to cover a broader scope of technology in order to begin the goal of all students becoming technologically literate as expressed by President Bush in 1990.

In Virginia, the most recent survey developed for determining the needs of technology education teachers for professional development was compiled in 1989 by Dr. Charles A. Pinder of the Virginia Polytechnic Institute and State University. Pinder's goal was to involve classroom teachers, teacher educators and supervisory personnel in determining the variables for improving the teaching of technology in Virginia. The results were to directly affect the planning of regional inservice activities, graduate offerings, summer workshops, technical update experiences and other experiences needed for professional growth. The results of the study indicated that there was a strong interest in improving the knowledge and skills in the areas of compiling project ideas in high technology and developing courses in computer control, introduction to technology, principles of technology (PT) and introduction to engineering. Also reported was the strong interest in improving the knowledge and skills on the following topics

and technologies: computers, problem solving, CAD/CAM, robotics, lasers, communications and fiber optics. With the development of new curricula, many of the options presented in the survey needed to be revised in order to have a more current and accurate data base of information for future planning of continuing education.

Another source of information was a survey sent to the VTEA membership viewing opinions in reference to the 1992 summer conference. The survey gave a general consensus that the membership would prefer to have a three-day conference that would rotate annually to different universities. The majority preferred to have the conference Wednesday through Friday during the first or second week of August. The most commonly selected format chosen was a hands-on style of workshop which would be presented by a fellow teacher. A large percentage of respondents stated that they would bring a computer if necessary. Topics of the workshops varied, but the subjects of strong interest dealt with the use of computers, engineering activities and robotics (VTEA, 1992).

SUMMARY

With the current emphasis on the integration of academics and vocational education, the role of today's technology education teacher has become a keystone to our nation's future success. With the proper guidance, the

instructors of technology education can provide a base where the student's experiences from all areas, intellectual and applied, can be unified into an educational environment that will provide the student with the knowledge and experience needed to compete in the 21st century. In order to provide the instructors with this type of guidance, some type of continuing education must be developed. So that these experiences reach their maximum potential, the information must directly relate to the needs of the current technology education teacher. Therefore, a needs assessment study must be administered to determine the areas and topics which should be addressed.

CHAPTER III

METHODS AND PROCEDURES

The following chapter contains the methods and procedures that were used within this study. The study's focus was to determine the needs of the technology teachers of Virginia for professional development in the technical, philosophical and methodological perspectives, therefore, who else better to determine what they need than the technology teachers themselves. The most reflective way to determine the needs of the current technology education teachers was to conduct a descriptive study using a survey questionnaire.

POPULATION

Since the focus of the study was to determine the needs of the technology teachers in Virginia, the population consisted of all the current technology teachers in Virginia. The population was divided into two subgroups, VTEA members and non-members, in order to use the data for future uses.

INSTRUMENT DESIGN

In order for the collected data to contain the appropriate information, the instrument design was developed to address three general areas: personal

information, educational services, and professional development.

Personal Information

This area of information was used to determine a brief demographic description of the participating teachers. If a need to separate the data into different subgrouping was necessary, the information collected from this part would allow the data to be segregated into other corresponding subgroups. The subgroup areas were locality of employment, level of formal education and years of experience.

Educational Services

This section of information determined the opinions of the participating teachers in the area of teacher education programs. Also, their feelings of current graduate programs and possible open forums for continuing education.

Professional Development

This classification of information determined the areas and topics for professional development. Areas that were addressed were the technical, philosophical and methodological aspects of professional development. They included sessions for improving instruction in TE courses available through Virginia technology education programs along with sessions for updating the knowledge and skills

required by new technologies and/or concepts.

METHODS OF DATA COLLECTION

There were two elements of data collection used in this study. After the instrument design was complete, a survey questionnaire was sent to all the current technology education teachers in Virginia. For a sample of the survey questionnaire, see Appendix A. Then, to either remind or thank the participant for completing the survey questionnaire, a follow-up letter was sent to each technology education teacher. For a sample of the follow-up letter, see Appendix B.

METHODS OF STATISTICAL ANALYSIS

The survey questionnaire was designed with closed questions to simplify the interpretation of the results. To gain an abridged version of the data collected, the results were placed in a statistical format. The types of statistical analysis that were conducted on the collected data were percentiles, means, and standard deviations.

SUMMARY

This chapter outlined the methods and procedures used in this study. In order to properly determine the needs of the current technology education teachers in Virginia, a survey questionnaire needed to be developed, distributed, collected and analyzed. Once the data was analyzed, recommendations were developed based on the

findings of the collected data.

CHAPTER IV

FINDINGS

The intention of this chapter was to inform the reader of the information resulting from the survey conducted during the research. The problem of this study was to determine the needs of technology education teachers in the state of Virginia. These needs were classified into three areas of professional development: the technical aspect, philosophical aspect and methodological aspect. Also included in the survey were questions related to personal information, to determine the demographics of the population, and educational services, to see if the available services are meeting the population's needs. The results of the questionnaire were segregated into these three areas in order to organize the analysis of the data. In addition, the population was divided into two subgroups, VTEA members and non-members of VTEA, so that the survey's results may be for used for future planning.

DEMOGRAPHIC PROFILE

Overall, the survey was sent to 983 individuals. Of the 983 individuals, 439 people responded, which was 45% of the population. For a demographic summary based on the survey results, of the 439 responding teachers, 156 belong to VTEA, which was 36% of the responding population. In a

breakdown by region, the northern region contained the highest number of respondents, 142 of 439, and the most active VTEA membership was focused in the tidewater region, 55 of 156. See Table 1.

**TABLE 1
TECHNOLOGY TEACHERS BY REGION**

Population VTEA member	Regions					TOTAL
	NORTHERN	SOUTH CENTRAL	SOUTH WESTERN	TIDEWATER	VALLEY	
YES	44 10%	30 7%	12 3%	55 13%	15 3%	156 36%
NO	98 22%	39 9%	53 12%	66 15%	27 6%	283 64%
TOTAL	142 32%	69 16%	65 15%	121 28%	42 9%	439 100%

Frequency Missing = 10

The highest degree earned from the participants ranged from a bachelor degree to a doctorate degree. More than half of the population had attained a bachelor degree (52%), while a masters degree was the second most common degree earned (44%). Very few participants held a CAGS or educational specialist (3%) or a doctorate degree (1%).

See Table 2.

**TABLE 2
HIGHEST DEGREE EARNED**

Population VTEA member	Highest Degree Earned				TOTAL
	BACHELOR	MASTERS	EDUC SPEC OR CAGS	DOCTORATE	
YES	75 17%	75 17%	6 1%	1 0%*	157 36%
NO	156 36%	118 27%	6 1%	2 0%*	282 64%
TOTAL	231 53%	193 44%	12 2%	3 1%	439 100%

Frequency Missing = 10
* less than 1%

Since the interest of available courses was an important element, the level of instruction was a vital factor. A majority of the participants taught at the high school level (57%), as opposed to the junior high or middle school level (43%). Due to the participation of supervisors in the study, there was a number of unanswered surveys (5%) for this question. See Table 3.

**TABLE 3
INSTRUCTIONAL LEVEL**

Population VTEA member	Level		
	MIDDLE OR JR HIGH	HIGH SCHOOL	TOTAL
YES	66 16%	85 20%	151 36%
NO	116 27%	158 37%	274 64%
TOTAL	182 43%	243 57%	425 100%

Frequency Missing = 24

According to the data collected from the survey, the technology education field continues to be instructed by male teachers (93%), who range between ages 31-50 years of age (69%). Other than the 60 and over age group, the spectrum of ages of the participants was fairly distributive. See Table 4.

**TABLE 4
AGE OF TECHNOLOGY TEACHERS**

Population VTEA member	Age					TOTAL
	30 OR LESS	31-40	41-50	51-60	OVER 60	
YES	19 4%	55 13%	55 13%	23 6%	4 1%	156 36%
NO	38 9%	78 18%	116 26%	44 10%	7 2%	283 64%
TOTAL	57 13%	133 30%	171 40%	67 15%	11 3%	439 100%

Frequency Missing = 10

Mirroring the ages of the participants was the number of years taught by the respondents. The groups of years taught were divided into intervals of five years up to 30. The first five groups ranged in participation from 15% to 23%, with the 1-5 years being the most active. After 25 years of teaching, the groups drop to 10% for 25-30 and 3% for 31+. See Table 5.

**TABLE 5
NUMBER OF YEARS TAUGHT**

Population	Years							TOTAL
	VTEA member	1-5	6-10	11-15	16-20	21-25	26-30	
YES	33 8%	27 6%	25 6%	26 6%	27 6%	17 4%	2 0%*	157 36%
NO	66 15%	43 10%	52 12%	42 10%	42 10%	26 6%	10 3%	275 64%
TOTAL	99 23%	70 16%	77 18%	68 16%	69 16%	43 10%	12 3%	438 100%

Frequency Missing = 11

* equals less than 1%

Opposite the number of years taught was the maximum number of years until retirement. The groups for the retirement years were divided into intervals of three years. Since the largest number of participants were young teachers, the largest group for maximum numbers of years for retirement was 21+ (33%). The other groups averaged between 5% to 13%. See Table 6.

**TABLE 6
MAXIMUM YEARS FOR RETIREMENT**

Population VTEA member	Years								TOTAL
	1-3	4-6	7-9	10-12	13-15	16-18	19-21	21+	
YES	9 2%	11 3%	15 3%	21 5%	15 3%	11 3%	13 3%	60 14%	155 36%
NO	29 7%	28 7%	23 5%	36 8%	39 9%	12 3%	27 6%	81 19%	275 64%
TOTAL	38 9%	39 9%*	38 9%*	57 13%	54 13%*	23 5%*	40 9%	141 33%	430 100%

Frequency Missing = 19

* percentile rounded to the nearest 1%

EDUCATIONAL SERVICES

Two components that were categorized under educational services were continuing education programs and professional organizations. The first component, continuing education programs, relates to formal and informal programs. The questionnaire addressed the variety of course offerings through available graduate programs. A majority of the participants agreed somewhat that the course offerings were sufficient, while 27% disagreed somewhat. Only 10% completely agreed and 19% completely disagreed with the availability of courses. See Table 7.

**TABLE 7
ATTENDANCE OF SPONSORED WORKSHOP**

Population VTEA member	Attendance		
	YES	NO	TOTAL
YES	152 35%	5 1%	157 36%
NO	264 60%	17 4%	281 64%
TOTAL	416 95%	22 5%	438 100%

Frequency Missing = 11

In addition to graduate programs, the population was asked their point of view on sponsored workshops to update skills and knowledge in their instructional area. Of the 439 respondents, 416 (95%) noted that they would attend this type of workshop. See Table 8.

TABLE 8
SUFFICIENCY OF VIRGINIA'S GRADUATE PROGRAMS

<u>Population</u> VTEA member	<u>Variety of Rating</u>				TOTAL
	DISAGREE	DISAGREE SOMEWHAT	AGREE SOMEWHAT	AGREE	
YES	22 5%	47 11%	69 16%	16 4%	154 36%
NO	57 13%	68 16%	122 29%	25 6%	272 64%
TOTAL	79 19%*	115 27%	191 45%	41 10%	426 100%

Frequency Missing = 23

* percentile rounded to the nearest 1%

The second component of educational services, professional organizations, was included to determine the level at which the institutions are providing for the teacher's professional needs. According to the population's opinion, 60%-62% of the population agree to a certain extent that the NEA and ITEA groups fulfill their needs. For the AVA and VVA organizations, only 42%-43% of the population note that these groups fulfill the professional needs.

PROFESSIONAL DEVELOPMENT

The survey contained seventy-nine questions relating to the area of professional development. The

questions were divided into three focal areas: the interest level in technology education courses, the current knowledge level and the level for improvement of skills and knowledge, and the current application of available computers.

The first twenty-three questions dealt with the different technology education courses available to Virginia students. The participants were asked to indicate the level of interest, from one (lowest) through ten (highest) for updating their knowledge and skills in the available courses. Computing systems was the highest ranked course with a low standard deviation by both members and non-members of VTEA. The remaining courses did not rank in identical order, but were very similar with the exception of two selections, the principles of technology courses. The remaining top ten courses in sequential order were Introduction to Engineering, Research and Development Engineering, Communication Systems, Engineering Drawing/Design, Architectural Drawing/Design, Technological Systems, Principles of Technology I, Basic Technical Drawing, and Principles of Technology II. In place of the PT courses, the non-members chose Graphic Communications and Inventions and Innovations. The newest courses, Technology Foundations, Technology Transfer and Technology Assessment all received poor ratings. See Figure 1.

The next group of questions dealt with the level of knowledge in several content and methods areas. The

FIGURE 1

COURSE RANKING BY INTEREST

<u>VTEA MEMBERS</u>	<u>(NON-MEMBERS)</u>
1. Computing Systems	(1)
2. Introduction to Engineering	(10)
3. Research and Development Engineering	(7)
4. Communication Systems	(3)
5. Engineering Drawing/Design	(6)
6. Architectural Drawing/Design	(8)
7. Technological Systems	(9)
8. Principles of Technology I	(17)
9. Basic Technical Drawing/Design	(4)
10. Principles of Technology II	(16)
11. Graphic Communications	(2)
12. Inventions and Innovations	(5)
13. Materials and Processes Technology	(12)
14. Manufacturing Technology	(11)
15. Energy & Power	(15)
16. Introduction to Technology	(13)
17. Construction Technology	(14)
18. Technology Foundations	(21)
19. Electronics Technology I	(19)
20. Power & Transportation Technology	(18)
21. Technology Transfer	(23)
22. Electronics Technology II	(20)
23. Technology Assessment	(22)

participants were asked to indicate their level of knowledge from one (lowest) to five (highest) in the listed areas. Maintaining discipline in the classroom/laboratories was the highest ranked area with a low standard deviation by both members and non-members of VTEA. Also, the next three areas were selected identically. They were evaluating students progress, implementing design and problem solving activities into the classroom, and wordprocessing software. To round off the top ten selections, VTEA members chose the following areas:

developing and implementing design briefs, implementing cooperative learning practices, incorporating TSA activities into the classroom, basic computer language, graphics software, and adopting and redesigning facilities for technology education. The non-members of VTEA chose integration of technology, math and science along with desktop publishing in place of incorporating TSA activities into the classroom and basic computer language. See Appendix C for a complete listing of knowledge ranking of content and method areas.

The third area dealt with rating the interest for improving the participants skills and knowledge in the previously polled areas. The participants were asked to indicate their level of interest from six (lowest) to ten (highest) in the listed areas. Although it was ranked third for knowledge, implementing design and problem solving activities into the classroom was the highest ranking area for both groups. Graphics software and integration of technology, math and science were the following selections made by both VTEA members and non-members. To conclude the top ten selections, VTEA members chose the following areas for their interest to improve: MS-DOS operating systems, robotics, computer control technology, maintaining discipline in the classroom/ laboratories, multimedia presentation, developing and implementing design briefs, and AutoCAD software. The non-members of VTEA chose evaluating student's progress

along with adopting and redesigning facilities for technology education in place of developing and implementing design briefs and multimedia presentations. For a complete listing of interest ranking of content and method areas, see Appendix D.

NOTE: Within the content and method areas, the three perspectives of professional development have been intermixed so that the participants were not influenced by the categorization of the areas.

SUMMARY

In conclusion, the questionnaire contained 101 questions. These questions were developed to attain information in the areas of personal information, education services and professional development. The findings of the survey were organized and presented in a simple format for the reader.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The problem of this study was to determine the technical, philosophical and methodological needs of Virginia technology education teachers for professional development. This chapter summarizes procedures that were used for this study, draws conclusions about the data derived from the study and makes recommendations based on these findings.

SUMMARY

In order to determine the needs of the technology teachers, the current Virginia technology education teachers, supervisors and teacher educators of technology teachers were identified and polled. The survey questionnaire contained a variety of questions that covered personal information for a demographic profile, the sufficiency of educational services, the interest level of current technology education courses, and their knowledge and interest ranking of listed content and method areas.

A total of 449 participants replied with the survey after a follow-up letter was dispatched. After the responses were collected, they were organized, tabulated and analyzed. This data was the basis of the conclusions and recommendations.

CONCLUSIONS

The conclusions were based on the findings of the professional needs assessment survey. Since the purpose of the study was to determine the needs of Virginia technology education teachers, it is important to understand the nature of the participants, therefore, a character profile should be established. Using the demographic information provided from the survey, the average participant was a male teacher from the northern or tidewater area of the state who has earned either a bachelor or masters degree and did not belong to a professional education association. The average participant had been teaching for approximately eleven to fifteen years and planned to continue teaching another thirteen to fifteen years. Even though the years of experience seemed to represent middle aged teachers, all the divisions were represented well, especially the one to five year range. The author believes that this was the reason for several of the content and method areas to be ranked high repeatedly in both the lists for current extent of knowledge and the level of interest in improving their skills and knowledge.

With the purpose of determining the needs of technology education teachers, this study was developed with four goals in mind. They were:

- 1) to determine the need by the teachers to understand the philosophy of the current curriculum;

- 2) to determine the need to understand the methodology used by the current curriculum;
- 3) to determine the equipment operation needs by the technology teachers implementing the technology education curriculum;
- 4) to develop recommendations for inservice programs meet the determined needs of the technology education teachers.

To determine the philosophical, methodological, and technical needs of the technology education teachers, the participants were polled to rank listed content and method areas according to their interest. The fourth goal was recommendations from the author for inservice programs, which will be discussed within the recommendations section of this chapter.

The first goal of the research study was to determine the need by the teachers to understand the philosophy of the current curriculum. As shown in Appendix D, the highest ranked area that relates to the philosophical aspect was the role of technology education in the Virginia Commonwealth core of learning, fourteenth by VTEA members and eleventh by non-members. All the remaining philosophical areas fall below the midpoint on the ranking of interests. In order of their listing on the ranking, the other philosophical areas were developing strategic plans for program changes, developing a public relations program, designing developmentally appropriate

programs, Tech Prep linkages with high schools and community colleges, developing interdisciplinary outcome based instructional materials (OBE), and establishing and using advisory committees. For a complete listing of the interest ranking of content and method areas, see Appendix D.

The next research goal of the study was to determine the need to understand the methodology used by the current curriculum. The ten selected areas that were of a methodological nature, which were ranked the highest, were implementing design and problem solving activities into the classroom, integration of technology, math and science, maintaining discipline in the classroom/ laboratories, developing and implementing design briefs, evaluating student's progress, implementing school-community partnerships, adopting and redesigning facilities for technology education, implementing cooperative learning practices, implementing interdisciplinary team teaching, and implementing technology assessment activities. The remaining methodological areas fall below the midpoint on the ranking of interests.

The third goal of the research study was to determine the equipment operation needs by the technology teachers implementing the technology education curriculum. In the survey, the participants were polled on forty-eight content and method areas that covered the three aspects of professional development. In general, the respondents

demonstrated that they were mostly interested in increasing their knowledge in the technical areas. Of the top twenty ranked areas, thirteen were of a technical nature. They were graphics software, MS-DOS operating system, robotics, computer control technology, multimedia presentation, AutoCAD software, desktop publishing, videodiscs, CD ROM, basic computer language, VA Pen/Internet, computer numerical control, wordprocessing software, and CADKEY software. The other twelve technical areas were listed throughout the remaining twenty-eight positions.

In addition to the forty-eight content and method areas, the participants were also asked to rate their interest level for updating their knowledge and skills in the listed technology education courses. The higher ranking courses were courses that incorporated the use of computers, design/problem solving concepts and integration of different disciplines. Unfortunately, the three new high school courses, technology foundations (18), technology transfer (21) and technology assessment (23) were ranked at the lower end of the list. The author believes the low ratings of these courses were due to the newness of the courses, since many participants had not been exposed to the contents of the courses. But with the opportunity to involve more individuals in the courses, it was believed that the interest in these three courses would increase.

RECOMMENDATIONS

Based on the survey findings and the conclusions of this study, the following recommendations are made by the author:

1. An inservice program be developed by the state department of education to provide regional workshops to technology teachers on the three new courses (technology foundations, technology transfer, and technology assessment).
2. A rotating workshop network be developed by the state department of education to provide regional workshops/forums on the technical areas. These workshops could be sponsored by distributors and/or manufacturers of the products being used. For example, AutoCAD dealers could sponsor a workshop in a tidewater location one week, then relocate to another regional location the following weekend. Meanwhile, another sponsor such as a company who promotes products used in multimedia presentations could be at one of the other workshop sights. Another source of presenters could be educators from the secondary or university levels who are specialists in the area of interest. Other topics that could be used are graphics software, MS-DOS operating system, robotics, computer control technology, desktop publishing, videodiscs, basic computer language, and VA Pen/Internet.

3. The state department of education should sponsor philosophical regional workshops on topics such as the role of technology education in the Virginia Commonwealth core of learning, Tech Prep linkages with high schools and community colleges and developing strategic plans for program change. These topics effect current programs due to the stress being placed on the integration of technical and academic courses.

4. The VTEA sponsor open forums on concept and method areas selected by participating members during their periodical meetings. Topics could relate to the methodological aspect of professional development so that colleagues may share effective concepts they have used. Some areas may be implementing design and problem solving activities, integration of technology, math and science, maintaining discipline in the classroom/ laboratories, and developing and implementing design briefs

5. The VTEA to use the questionnaire findings to determine topics for interest sessions at the summer conference. Based on the interest ranking of concept and method areas, the topics that would prove to be sufficient would be implementing design and problem solving activities into the classroom, integration of technology, math and science,

graphics software, MS-DOS operating system, robotics, computer control technology, maintaining discipline in the classroom/laboratories, multimedia presentation, developing and implementing design briefs, AutoCAD software, desktop publishing, videodiscs, CD ROM, the role of technology education in the Virginia Commonwealth core of learning, and basic computer language. Naturally, if one of these areas were addressed by an inservice program conducted prior to the summer conference, then the topic should not be repeated.

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APPENDICES

- Appendix A - Sample of the survey questionnaire**
- Appendix B - Sample of the follow-up letter**
- Appendix C - Knowledge Ranking of Content and Method Areas**
- Appendix D - Interest Ranking of Content and Method Areas**

APPENDIX A
Sample of the Survey Questionnaire

APPENDIX A

VIRGINIA TECHNOLOGY EDUCATION TEACHERS
PROFESSIONAL NEEDS ASSESSMENT

Dear Colleague:

The technology education profession is faced with the challenge of educating people to understand, apply, and assess technology. As we prepare for the future, it is imperative that we involve classroom teachers in the identification of what should be done to promote excellence in technology teaching in Virginia.

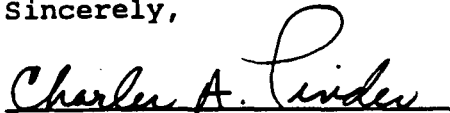
We need your assistance in developing a resource bank of information on the current magnitude of professional needs and interests of technology teachers. This information will be used in the planning of summer workshops, regional inservice activities, technical update courses, university graduate offerings, and other experiences essential for professional growth during the 1990's.

This survey is a cooperative effort of the Virginia Department of Education, the Virginia Technology Education Association, and the Technology Education Programs at Old Dominion University and Virginia Tech. Your involvement is essential for this needs assessment survey to do its intended job.

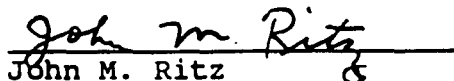
Please fill out the attached survey of Virginia Technology Education Teachers Needs Assessment and help our profession to meet your needs through appropriate inservice training. Specific responses will not be reported in such a manner that individual respondents can be identified. Return your survey answer sheet in the enclosed addressed envelope by May 20, 1993 to: Virginia Tech, Technology Education, 144 Smyth Hall, Blacksburg, VA 24063-9956.

Thank you very much for your time and cooperation. We look forward to your input.

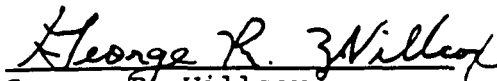
Sincerely,



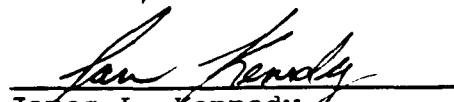
Charles A. Pinder
Associate Professor
Virginia Tech
Blacksburg, VA



John M. Ritz
Professor
Old Dominion University
Norfolk, VA



George R. Willcox
Principal Specialist
Technology Education
VA Dept. of Education
Richmond, VA



James L. Kennedy
Technology Teacher
Gloucester High School
Gloucester, VA

APPENDIX A (cont'd)

**VIRGINIA TECHNOLOGY EDUCATION TEACHERS
PROFESSIONAL NEEDS ASSESSMENT**

GENERAL INSTRUCTIONS

This survey contains a list of questions which address the current needs and interest of those involved in the teaching of technology in Virginia. Please answer every question on BOTH sides of the survey sheets. The questions are easy to answer and you should complete the entire form in approximately 20 minutes. Each survey has been given an identification code for follow up purposes. This will enable us to keep track of all surveys returned. The results of this study will be presented at the 1993 Technology Education Summer Conference.

If you have any questions, contact: Charles A. Pinder, 144 Smyth Hall, Virginia Tech, Blacksburg, VA 24061-0432 (Tel. 703-231-3056).

Thank you, your perspective is important to us.

APPENDIX A (cont'd)

VIRGINIA TECHNOLOGY EDUCATION TEACHERS
PROFESSIONAL NEEDS ASSESSMENT

Please mark your answers on the enclosed answer sheet. Use a No.2 pencil to blacken in the correct circle for each question.

1. Which one of the following regions are you currently employed as a technology teacher?
1) Northern (Mark responses on answer sheet)
2) South Central
3) South Western
4) Tidewater
5) Valley
2. What was the last degree or academic certificate you have earned?
1) Bachelor
2) Masters
3) Educational Specialist or (CAGS)
4) Doctorate
3. What is your school level?
1) Middle or junior high school
2) High School
4. Are you: 1) Female 2) Male
5. Your age is:
1) 30 or less 4) 51-60
2) 31-40 5) Over 60
3) 41-50
6. How many years have you been teaching technology education?
1) 1-5 5) 21-25
2) 6-10 6) 26-30
3) 11-15 7) 31+
4) 16-20
7. How many years do you plan to teach before retirement?
1) 1-3 5) 13-15
2) 4-6 6) 16-18
3) 7-9 7) 19-21
4) 10-12 8) 21+
8. If you were provided the opportunity to attend a workshop in your region designed to update your knowledge and skills in the subject you teach (at no charge), would you attend?
1=Yes
2=No

APPENDIX A (cont'd)

Questions 9-14: Mark the answer sheet to tell whether you are a member of the following organizations:

- 9. AVA 1=Yes 2=No
- 10. NEA 1=Yes 2=No
- 11. ITEA 1=Yes 2=No
- 12. VEA 1=Yes 2=No
- 13. VTEA 1=Yes 2=No
- 14. VVA 1=Yes 2=No

Questions 15-20: Mark the extent to which the following organizations meet your professional needs:

- 15. AVA 1=Not at all 2=Some what 3=Quite well
- 16. NEA 1=Not at all 2=Some what 3=Quite well
- 17. ITEA 1=Not at all 2=Some what 3=Quite well
- 18. VEA 1=Not at all 2=Some what 3=Quite well
- 19. VTEA 1=Not at all 2=Some what 3=Quite well
- 20. VVA 1=Not at all 2=Some what 3=Quite well

21. To what extent do you agree that technology education graduate programs in your region offer a sufficient variety of courses each semester to meet your professional needs?

- 1) I completely disagree
- 2) I disagree somewhat
- 3) I agree somewhat
- 4) I completely agree

Questions 22-44 list technology education courses. For each course indicate the extent of your interest in updating your knowledge and skills using a scale of 1 to 10 where:

1=low interest 10=high interest.

- 22. Introduction to Technology
- 23. Inventions and Innovations
- 24. Technological Systems
- 25. Technology Foundations
- 26. Technology Transfer
- 27. Technology Assessment
- 28. Communication Systems
- 29. Computing Systems
- 30. Graphic Communications
- 31. Basic Technical Drawing/Design
- 32. Engineering Drawing/Design
- 33. Architectural Drawing/Design
- 34. Electronics Technology I
- 35. Electronics Technology II
- 36. Power & Transportation Technology
- 37. Energy & Power
- 38. Principles of Technology I
- 39. Principles of Technology II
- 40. Introduction to Engineering
- 41. Research & Development Engineering
- 42. Materials & Processes Technology

APPENDIX A (cont'd)

Please continue to respond to the same scale as before:

- 43. Construction Technology
- 44. Manufacturing Technology

Questions 45-92 list content and methods areas. For each area, indicate the extent to which you presently possess knowledge and skills using the following scale:

1=low 5= high knowledge and skills

T H E N

on the same line in the answer column indicate your interest in updating your knowledge and skills using the following scale:

6=low 10= high interest

For Example:



- 45. BASIC computer language
- 46. MS-DOS operating system
- 47. Logo computer language
- 48. Unix/Fortran/Pascal/C++ computer language
- 49. Graphics software
- 50. CADKEY software
- 51. Word processing software
- 52. Videodiscs
- 53. Multimedia presentation
- 54. Distance learning
- 55. VA PEN/Internet
- 56. Computer control technology
- 57. Biotechnology
- 58. Robotics
- 59. CD ROM
- 60. Computer numerical control
- 61. AutoCAD software
- 62. VersaCAD software
- 63. Desktop publishing
- 64. Spreadsheet applications
- 65. Data based management
- 66. Games & simulations
- 67. Tech Prep linkages with high schools and community colleges
- 68. Integration of technology, math and science
- 69. Incorporating TSA activities into the classroom
- 70. Implementing design and problem solving activities into the classroom
- 71. Developing & implementing design briefs
- 72. Portfolio development and assessment
- 73. Conducting research with students
- 74. Rendering with pencils, markers, & airbrushes
- 75. Modeling with Lego
- 76. Modeling with Fischer Technik

APPENDIX A (cont'd)

Please continue to respond to the same scale as before:

77. Maintaining discipline in the laboratory/classroom
78. Implementing Lab 2000
79. Implementing technology assessment activities
80. The role of technology education in the Virginia Commonwealth core of learning
81. Developing interdisciplinary outcome based instructional materials (OBE)
82. Adopting and redesigning facilities for technology education
83. Evaluating student progress
84. Implementing cooperative learning practices
85. Designing developmentally appropriate programs
86. Implementing school-community partnerships
87. Implementing flexible scheduling
88. Implementing interdisciplinary team teaching
89. Developing strategic plans for program change
90. Modeling historical developments
91. Developing a public relations program
92. Establishing & using advisory committees

Items 93 - 101 list types of computers. For each type of computer, indicate its **PRIMARY APPLICATION** using the following options: (Please mark only the primary application)

- | | |
|----------------------------|-------------------------------------|
| 1=Computer control | 6=Data based management |
| 2=Word processing | 7=Games & simulations |
| 3=VA PEN | 8=CAD/CAM |
| 4=Desktop publishing | 9=Multimedia presentations |
| 5=Spreadsheet applications | 10=Do not have or other primary use |

93. Apple IIe Series
94. Apple IIGS
95. Macintosh (68030 & 040)
96. Macintosh (68000)
97. MS-DOS* (XT/AT) Note: *(MS-DOS=IBM or Compatible computer)
98. MS-DOS* (286)
99. MS-DOS* (386)
100. MS-DOS* (486)
101. Commodore 64

Thank you for your participation in this study. Please list any other area(s) that you would like to learn more about:

Please return answer sheet in the envelope provided to:

**Virginia Tech
Technology Education
144 Smyth Hall
P.O. Box 850
Blacksburg, VA 24063-9956**

APPENDIX B

Sample of the follow-up letter

APPENDIX B

May 24, 1993

Dear Colleague:

Several days ago you received a survey to get information about your professional needs and interest in teaching technology. If you have already completed and returned it, let me thank you for your help. Your input is important.

If you have not completed and returned the survey, please do so within the next few days. We need your response by May 31, 1993.

Thank you for your help.

Charles A. Pinder
Associate Professor
Technology Education

APPENDIX C
Knowledge Ranking of Content and Method Areas

APPENDIX C

KNOWLEDGE RANKING OF CONTENT AND METHOD AREAS

VTEA MEMBERS

(NON-MEMBERS)

1. Maintaining discipline in the classroom/laboratories (1)
2. Evaluating students progress (2)
3. Implementing design and problem solving activities into the classroom (3)
4. Wordprocessing software (4)
5. Developing & implementing design briefs (7)
6. Implementing cooperative learning practices (6)
7. Incorporating TSA activities into the classroom (28)
8. Basic computer language (14)
9. Graphics software (5)
10. Adopting and redesigning facilities for technology education (9)
11. MS-DOS operating system (11)
12. Designing developmentally appropriate programs (13)
13. The role of technology education in the Virginia Commonwealth core of learning (21)
14. Intregation of technology, math and science (8)
15. Portfolio development and assessment (17)
16. Implementing school-community partnerships (20)
17. Games and simulations (18)
18. Modeling with Lego (31)
19. Desktop publishing (10)
20. Conducting research with students (12)
21. Implementing interdisciplinary team teaching (15)
22. Developing strategic plans for program change (16)
23. Robotics (25)
24. Developing a public relations program (19)
25. Modeling historical developments (24)
26. Multimedia presentation (27)
27. Establishing and using advisory committees (22)
28. AutoCAD software (34)
29. VA Pen/Internet (40)
30. Implementing technology assessment activities (26)
31. Implementing flexible scheduling (29)
32. Computer control technology (33)
33. Spreadsheet applications (23)
34. Rendering with pencils, markers & airbrushes (30)
35. CADKEY software (35)
36. Implementing Lab 2000 (41)
37. Data based management (36)
38. Computer numerical control (37)
39. Videodiscs (42)
40. Developing interdisciplinary outcome based instructional materials, OBE (32)
41. Modeling with Fischer Technik (43)
42. CD ROM (38)

APPENDIX C (cont'd)

- 43. Logo computer language (43)
- 44. Tech Prep linkages with high schools and community colleges (39)
- 45. VersaCAD software (46)
- 46. Distance learning (44)
- 47. Biotechnology (45)
- 48. Unix/Fortran/Pascal/C++ computer language (48)

APPENDIX D

Interest Ranking of Content and Method Areas

Appendix D

INTEREST RANKING OF CONTENT AND METHOD AREAS

VTEA MEMBERS

(NON-MEMBERS)

1. Implementing design and problem solving activities into the classroom (1)
2. Intregation of technology, math and science (3)
3. Graphics software (2)
4. MS-DOS operating system (6)
5. Robotics (8)
6. Computer control technology (5)
7. Maintaining discipline in the classroom/laboratories (4)
8. Multimedia presentation (19)
9. Developing & implementing design briefs (16)
10. AutoCAD software (10)
11. Desktop publishing (15)
12. Videodiscs (18)
13. CD ROM (22)
14. The role of technology education in the Virginia Commonwealth core of learning (11)
15. Basic computer language (12)
16. VA Pen/Internet (36)
17. Evaluating students progress (7)
18. Implementing school-community partnerships (13)
19. Computer numerical control (23)
20. Wordprocessing software (14)
21. Adopting and redesigning facilities for technology education (9)
22. Implementing cooperative learning practices (20)
23. Implementing interdisciplinary team teaching (17)
24. CADKEY software (21)
25. Implementing technology assessment activities (29)
26. Portfolio development and assessment (37)
27. Spreadsheet applications (28)
28. Developing strategic plans for program change (26)
29. Developing a public relations program (30)
30. Games and simulations (33)
31. Designing developmentally appropriate programs (25)
32. Conducting research with students (27)
33. Tech Prep linkages with high schools and community colleges (24)
34. Incorporating TSA activities into the classroom (39)
35. Data based management (35)
36. Biotechnology (46)
37. Implementing flexible scheduling (31)
38. Rendering with pencils, markers & airbrushes (32)
39. Developing interdisciplinary outcome based instructional materials, OBE (38)
40. Logo computer language (41)
41. Establishing and using advisory committees (43)

APPENDIX D (cont'd)

- 42. Modeling with Lego (34)
- 43. VersaCAD software (44)
- 44. Modeling historical developments (45)
- 45. Distance learning (47)
- 46. Modeling with Fischer Technik (42)
- 47. Implementing Lab 2000 (40)
- 48. Unix/Fortran/Pascal/C++ computer language (48)