1991

A Study to Determine International Technology Education Association Teacher of the Year Recipient Attitudes Toward Program Change in Technology Education

Kevin Wayne Wong
Old Dominion University

A STUDY TO DETERMINE INTERNATIONAL TECHNOLOGY EDUCATION ASSOCIATION TEACHER OF THE YEAR RECEPIENT ATTITUDES TOWARD PROGRAM CHANGE IN TECHNOLOGY EDUCATION

A RESEARCH PROJECT

PRESENTED TO

THE FACULTY OF THE GRADUATE SCHOOL

OLD DOMINION UNIVERSITY

IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF SCIENCE IN EDUCATION

BY

KEVIN WAYNE WONG, M.S.

AUGUST, 1991

This project was prepared by Kevin Wayne Wong under the direction of Dr. John Ritz in OTED 636, Problems in Education. It was submitted to the Graduate Program Director as partial fulfillment of the Master of Science in Education degree.

APPROVED BY:

John M. Ritz

Dr. John M. Ritz
Advisor

Date 8-18-91

John J. DeRolf III

Dr. John J. DeRolf, III
Graduate Program Director

Date 8/20/91

TABLE OF CONTENTS

APPENDIXES **Page**

LIST OF TABLES

CHAPTER I
INTRODUCTION

For years Industrial Arts has focused primarily on developing manipulative skills and understanding about materials and processes. We have been accustomed to follow step by step instructions that were given by teachers and students that were interested in making projects in order to reach a desired goal or outcome. Technology and society are changing every moment and students will be called upon to find the answers to problems that do not have set instructions or predetermined goals. As the future approaches, students will need to become technological literate and be able to adapt to the changes that the work force offers.

Technology education's role had always been one of applied themes; however, will our traditional methods to approach this subject be enough for the students to survive in the future. Traditionally, we have set goals for student achievement and supplied them with step by step procedures to reach these goals. With the recent push for excellence in education, will the basic industrial arts approach to the study of technology be enough for the students to master the vast growing technological society that they live in?

The transition from industrial arts to technology education has been a major issue for the profession in the past decade. Are teachers teaching true technology education or have they just made a change in name? The question is what should we be teaching and what activities should we institute for our kids to become technologically literate. Overall, industrial arts has changed, but are teachers going along with the change or are they keeping to their traditional methods? The following research will investigate International Technology Education Association (ITEA) teachers of the year instructional focus in technology education and their perception toward changes within their programs.

During the 70s and 80s there had been discussions within our profession on implementing technology education programs; programs that were much different than our traditional programs which employed the industrial arts approach. A number of books have explained what technology is and how we can "do" technology in our laboratories.

Finding teachers who teach a "true" technology education curriculum in our schools today is rare. Viewing technology education as the NEW BASIC, the question arises as to why the school systems are not implementing these programs. The purpose of this research is to ascertain, through survey, the direction in which technology education is heading. The survey will be directed to those teachers of technology education who have been selected "Teacher of the Year" through their respective states and its Technology Education Association. This survey focused on six classifications of technology education which exist in the schools presently.

Statement of the Problem

The problem of this study was to determine International Technology Educational Association Teacher of The Year recipient program status since being selected as teacher of the year by their individual states.

Research Goal

The following goals were used to direct this study:

1. Determine the technology education program classification of teachers of the year when they were selected for the honor.
2. Determine if programmatic changes have been made by teachers since being selected as teacher of the year.

3. Determine the state of technology education programs as taught by ITEA teacher of the year recipients.

Background and Significance

During the National Governor's Association meeting in March, 1990, state leaders had as a goal to make schools in the United States second to none. One of the main goals resulting from the conference read: "All workers will have the opportunity to acquire the knowledge and skills needed to adapt to constantly emerging new technologies, new work methods, and new markets through public and private vocational, technical, workplace, or other innovative programs" (Education Week, March 7, 1990, p. 16). If society is to adapt to the new changes of technology, then our educational programs must change. If this does happen, then technology education should become the NEW BASIC of education. The question is "Can we make the adjustments to make technology education a reality? " (Ritz, 1991, p. 4).

The philosophy for technology education is not new. During the 70s and 80s there were numerous publications written by members of our profession with new ideas for implementing technology education programs that were far different than our traditional industrial arts approach. The main emphasis of these writings was what is technology and how can we implement technology into our laboratories and schools.

There have been many articles and seminars provided to our profession for this transition to technology education. However, there has been little seen of teachers teaching a "true" technology education program in our schools. If technology education is to become the NEW BASIC, why are schools not improving or adapting to this new program. A survey of the profession (Dugger, et. al., 1990, p. 28) showed change is occurring within the name rather than the instructors understanding of the underlying philosophical differences between industrial arts and technology education.

There continues to be much confusion in our field as to what are technology education programs and what must we do to have them. Again, there have been numerous inservice training in re-designing curriculums for technology education, but we must set a standard of what we find acceptable for the education of our society (Ritz, 1991, p.5).

John Holley, an Australian who is from Hawthorn Institute of Education, visited the states in the fall/winter of 1988-89. During his visit he observed 22 states with technology education programs. In Holley's report,"Initial Report on USA Tour 1988," he found various levels of technological study in practice. His labels of our programs were as follow:

1. Industrial Arts- Pre-vocational, preparing students for employment.
2. Industrial Arts General- Exploring and understanding industrial applications.
3. Industrial Technology- Being influenced by career preparation.
4. Technology Education- Area of technology which is broad based and includes the study of industrial, agricultural and informational technologies.
5. Design and Technology- Focus on problem solving without much regard to content.
6. Technological systems- Integrating problem solving within the systems content of technology.

Holley has shown us that there is confusion within our technology education profession. This analysis showed that there are various levels of technology programs being taught in what we call technology education. Can we accept all the above as programs for technology education and should we? If not, which ones are we willing to accept as technology education programs?

Limitations

The following were limitations that should be considered when reviewing

this research study:

1. The research has been limited to the period between 1988 - 1990.

2. Those individuals surveyed have been limited to ITEA Teacher of the Year recipients.

Assumption

When considering the groups and conditions in which the research was conducted, certain criteria must and may be assumed. The following were assumption that have been made for this study.

1. Those teachers chosen as teacher of the year are implementing a change in their curriculum.

2. Those surveyed, being all teachers of technology education, have different opinions of what technology education is.

3. The teachers that were surveyed were exposed to the recent philosophical opinions that have emerged in their field of teaching.

4. Having been chosen as teacher of the year, an assumption can be made that these teachers are continually striving to improve upon their curriculum and implementation of this program as well.

5. Consideration is to be taken, that the data was received and gathered through survey and the questions were answered in all honesty with unbiasedness.

Procedures

This research was devised to determine the stage of transition that exists within technology education programs. In order to obtain the data for this analysis, a survey was designed and sent to 1988-1990 International Technology Education Association Teacher of the Year awardees. It should be noted that the teachers that were selected during the 1990 year received their award in 1991.

The survey was comprised of questions asking these teachers to reflect on their present program of technology education, and their opinions towards the changes taking place in Technology Education. The survey itself focused on six levels of Technology Education which are presently being practiced. These levels, as identified by Ritz (1991) included: Shop, Industrial Arts, Industrial Technology, Design Technology, Technical Systems, and Technology Education. Presented with these program options, the teacher chose the area in which he/she was practicing prior to selection as teacher of the year and which level was presently being practiced. Upon return of these surveys, the information was compiled and analyzed to determine the state-of-art of implementing technology education.

Definition of Terms

The following information was provided to insure that the reader of the study had an understanding of terms used that may be abstract or unfamiliar.

ITEA: International Technology Education Association.

Teacher of the Year: Selected as superior in his/her field for being an outstanding state educator.

Levels of Technology Education:

Shop:	Emphasis on material usage and tool skill development. Students memorize tools, machine parts, safety rules, types of materials and student activities focus upon the "making" of products.
Industrial Arts:	Development of knowledge and skills of the processes used by industry. Examples are drafting, wood working, and metal working.
Industrial Technology:	Modern industrial arts. Focus continues to be on knowledge and skill development through industrial processes. New tools of technology are introduced such as computers, CNC mills and lasers.
Design Technology:	Originates in the British system of Craft, Design, and Technology. Focus is on the development of problem solving skills with technological content becoming secondary.
Technical Systems:	The study and application of modern systems of communication, construction, manufacturing and transportation.
Technology Education:	Study and application of the systems of technology including the impacts of technology on the individuals, society and the enviroment.

Overview of Chapters

Technology Education is replacing industrial arts but are teachers teaching or willing to teach this type of program? Throughout the United States there are six levels of technology education being taught. Each level has it own philosophy. Are we able to accept all of these levels of technology education? If not, we must set a standard to what philosophy will benefit the students in tomorrow's society. Some teachers will change, but some feel that the traditional methods associated with industrail arts is in the right direction. However, each year programs are changing and new programs are being added. Will these programs and changes benefit our youth? With this survey ITEA teachers of the year will express their opinions on technology education and their perception toward their program.

The following chapters will review the literature provided by those who have adapted to the changes occuring in technology education. The methods and procedures used in the study will be discussed in Chapter III. The findings of the research study will be presented and explained in the text of Chapter IV. Chapter V of the study will include a summary of what was learned and discussion of the findings and recommendations of this study will be presented so they can be used to aid our presentation of Technology Education into the future.

Chapter II

Review of Literature

The prospect of technology education replacing our traditional forerunner, industrial arts, has caused concern by some in our profession. In 1980, a series of symposia initiated a debate causing clarification of philosophy and identification of the appropriate content. During the symposia, a need was identified to provide resources for educators at all levels on implementation, strategies, procedures, and examples of Technology Education.

A great deal of progress has been made at the local, state and national levels that support the concept of technology education. The national association has re-aligned traditional philosophies, made long range plans and changed industrial arts to reflect the study of technology. Several states and local districts have also made changes in their planning, curriculum updating, and name changes.

A technological society mandates that people be able to identify problems, gather data, synthesize that data, make decisions, and evaluate the results. Moving from psychomotor skills for the sake of generating a predetermined product to using technical means in conjunction with valuing skills to solve technical problems is the heart of technology education (Lauda, 1984 p.5).

In this chapter the history of technology education and its philosophy will be discussed. Furthermore, the various levels on programatic focuses of technology education, as taught in today's programs throughout the United States, will be explained in detail.

History

In the spring of 1970 a group of graduate and postgraduate students at West Virginia University were presented with the question of "What title should be given to a program designed to help students comprehend their technological inheritance and technological future?" (Lauda, 1984). With careful consideration, it was decided that such a program should be called Technology Education. Years to follow, many colleges and universities have renamed and restructed their industrial arts education programs to reflect a technology- based orientation.

The ultimate goal is to educate humans so they become autonomous individuals. The goal must also provide students with the appropriate tools so they can choose for themselves among varied alternatives. As we move through the latter portion of the twentieth century, we face unprecedented technological change. It is important, in this information age that the educational system continually alter its content and instructional strategies to keep pace with the radical change (Lauda & McCrory, 1984, p. 16).

Technology has always been a primary determinant of our culture. Its history is as old as the human race and it helps us adapt to the future. Students will need to differentiate characteristics of the technical means as they relate to problems at hand in the terms of the content identified for a technology education program. Like science, technology pursues knowledge, but of a different kind. In science we pursue the reality which exists in the natural environment. In technology we study the realities generated by the human (Launda & McCrory, 1986, p. 24).

In today's society, humans live and work to satisfy their needs and wants. In order to ease the work, humans are constantly applying technology and resources to better their lives. Kranzberg, an educator in the field of technology, states: "While animals live within the limits of a given environment, humans live in a continuous and continuing process of attempting to cope with their physical environment in order to meet basic needs and to satisfy wants. Through technology (human work) people attempt to subdue or control their environment by the combined efforts of intelligence and use of available resources " (Kranzberg, 1987, p. 7).

The educational system for today cannot afford to provide society with individuals who live in a high technology society with a low level of technological understanding.

Philosophy of Technology Education

A technology education program or activity should apply the technological systems of production, communication or transportation. The program should be knowledge based and not just a study of tools and processes. The programs and activities should look at the social and cultural impacts that technology has on the environment. If tools and materials are to be used, the activities should be based on solving a problem. The problems may be related to scientific and mathematical relationships such as aerodynamics and mechanical advantages (Balistreri, 1986, p. 22).

In studying technology, we must look at how technology has changed or improved our environment. We need to look at its history and how it has improved life, products, and processes, and how and why it was used. How does it impact the environment through energy and resource depletion? How does it effect the economy and does it provide or take jobs from the society? Also, does it have any effects on our global society? These questions are important and must be related to our programs so that technology may be directed into the right course.

The tools and machines and the concepts related the the use of materials and processes still remain important as they are in the traditional curriculum. However, the student must be presented with information on how to use machines, tools, materials and processes which may be associated with a problem to be solved. Consequently, there is no set plan given to the student to solve the problem. Through technology education the profession can move from instructing to questioning, from giving solutions to asking for new and innovative responses coming from the students (Anderson, 1989, p.7).

Technology Education
Levels of Implementation

To achieve its goal of providing people with requisite knowledge and skills for living and earning their livelihoods in this new era, education must include technology within its curricula. To achieve productivity and quality in conveying necessary knowledge and skills, education must use technology as a principal means. As our world becomes increasingly more technological, and our learners require the ability to make decisions based on intellectual rather than emotional criteria, technology education should enjoy greater visibility.

There has been funding provided for the development of industrial arts teachers to become technology teachers, however school systems have shown little, if any, progress toward the new philosophy. Have the teachers become lost in the transition or do they not have the practical guidance of teacher educators to help them bridge the gap (Ritz, 1991, p. 6).

It appears that many efforts in the movement toward technology education have failed because the changes have been made in the name only, rather than in the instructors understanding of the philosophical differences between industrial arts and technology education (Clark, 1989, p. 23).

There seems to be confusion as what technology education programs are and what must we do to have them. Various levels or focuses of technology education exist. John Holley, an Australian from Hawthorn Institute of Education, visited the states in the fall/winter of 1988-89. In Holley's "Initial Report on USA study Tour 1988," he indicated that there were a number of different approaches to technology education implementation. John M. Ritz, of Old Dominion University, Norfolk, Virginia, has written on the program changes in technology education. He has attempted to clarify Holley's observations of the existing technology education programs. The following six types of technology education programs exist in today's schools (Ritz, 1990, p. 6).

<u>Shop</u>:

Emphasis is on material usage and tool skill development. The making of projects is the primary instructional outcome. Students memorize tools, machine parts, safety rules, and types of materials while student activities focus upon the "making" of products.

<u>Industrial Arts</u>:

The program focuses on the development of knowledge and skills of the processes used by industry. Some examples are of the content studied are drafting, woodworking and metal working.

<u>Industrial Technology</u>:

This is a modern form of industrial arts. Focus continues to be on knowledge and skill development learned through industrial processes.

However, these programs bring in the new tools of technology such as computers, CNC mills and lathes, lasers, and digital electronics.

Design Technology:

This type of program originated with the British system of Craft, Design and Technology. Focus is on the development of problem solving skills with technological content becoming secondary. Students encounter activities which require the application of problem solving technique to design products.

Technical Systems:

This type of program is focused on the study and application of modern systems of communication, construction, manufacturing and transportation. Emphasis is on an analysis of technical system resources, applications and outputs.

Technology Education:

This level of program focuses on the study and application of systems of technology including communication, production and transportation. Study includes system design, their application and outcomes, however the impacts that the application of technology has on individuals, societies and the environment are also stressed.

As has been illustrated, various levels of technological study exist in the program that we call technology education. Can we accept all of the viable options for technology education in today's schools? If not, which ones are we willing to accept as viable programs? Can we expect all teachers to teach a true technology education program?

Requirements for Selection as Technology Teacher of the Year Award

Each year throughout the United States, there is a Technology Teacher Award of teaching excellence in Technology Education. There are certain criteria that the candidates must possess. The following criteria were taken from the Teacher of the Year Selection Committee, Technology

Education, James Madison University, Harrisonburg, Virginia. According to Virginia's guidelines, the teacher must meet the following requirements:

1. Must be a current member of both the Virginia Technology Education Association and the International Technology Education Association.

2. Must have held memberships in both the state and National Association for the preceeding year.

3. Must be certified to teach technology education in his/her state.

4. Must be a teacher whose superiors believe is worthy of being considered an outstanding state educator (Van Dyke, 1991).

In determining a candidate for the Technology Teacher of the Year Award, the teachers are evaluated using the following checklist:

1. The teacher is and has been an active member of the state association and the ITEA.
2. Students are enthusiastic about their technology education program.
3. Students show pride in their work and participate in TSA activities.
4. Students admire and respect the teacher as a model adult.
5. Instruction is based upon the interests, needs and abilities of the learner.
6. The teacher keeps abreast of developments in technology education.
7. The teacher maintains an orderly and effective teaching environment.
8. The teacher is active in profession organizations and activities.
9. The teacher attends state and national conferences on technology education.
10. The teacher makes a strong effort to improve and grow professionally (Dyke, 1991).

As teachers are nominated for the award in his/her state, they are then sent to the state chairperson who is responsible for Teacher of the Year selection committee. The teachers are then visited. The one that is selected is given their award at the International Technology Education Association annual conference.

Summary

It appears that for many, the movement from industrial arts to technology education has been in name only, rather than teachers understanding the differences between industrial arts and technology education. In a technology program the "arts" or skills are no longer an end product. The key to technology education is in the study and applications of technology to solve human needs and problems. In its application it becomes necessary to look at the impact and significance of technology on individuals, society, and the enviroment.

Each year those teachers who practice the traditonal methods or the new methods of technology education will be selected by their superiors as outstanding educators in their field. Being selected, the teacher should have either changed or improved his/her program in technology education. Each year, technology education will have new programs allowing for changes to occur. Until standards for technology education occur, there will always be a gap between program focuses.

Chapter III

Methods and Procedures

Chapter III, Methods and Procedures, will define and discuss the population studied, the instrument used, procedures for collecting data, and the statistical analysis used. Chapter III should aid the reader in obtaining a clearer understanding of what actually took place throughout the research study.

Population

The population of the study were male and female teachers who were members of International Technology Education Association. The teachers were either teaching technology education at the junior high or high school level. In order to make this study feasible, the teachers who were surveyed were teachers who had been designated technology education teacher of the year for their representive state.

The population included teachers who were teacher of the year starting from 1988 to 1990. There were 110 teachers used as the population for this study. Appendix A contains the listing of the population.

Instrument

The instrument used in gathering the data for this study was designed from an article titled "Where Might our Changes Lead Us?" by John M. Ritz, D.T.E. of Old Dominion University, Norfolk, Virginia (see Appendix B). The survey consisted of a listing of the six levels or focuses of technology education programs that Ritz stated were being taught by our profession. The survey included three questions concerning technological program classifications. It asked teachers to describe the type of program they were teaching before and after being selected for the honor as technology teacher of the year. It also asked if there had been any programmatic changes since being selected as teacher of the year.

Data Collection Procedures

The purpose of the study was to determine ITEA Teachers of the Year recipient program status since being selected teacher of the year. A cover letter was sent to all ITEA Teachers of the Year for the years 1988-1990 (see Appendix C). A cover letter explaining the purpose of the study was compiled. Each teacher was also provided a survey. Along with the survey the teachers were given instructions on how to answer the survey questions and when the survey was to be returned (Appendix D). The survey was administered from May 13 to June 21, 1991. Upon completion of the survey, the teachers responses on their program status before and after their award will be scored and recorded .

Once the surveys for each teacher have been calculated, the surveys will be grouped according to their program classification. The first group will include the technological classification the teacher was teaching before being selected for the honor. The second group will include the technological classification the teacher is teaching after the honor. Finally, the third group will include if any programmatic changes have been made after being selected for the honor.

Statistical Analysis

Each of the program classifications for the teachers before and after being selected as teacher of the year were tabulated in frequencies of response according to their classification. Each of the classifications will be marked into percentages according to the number of teachers answering each category.

A percentage will be recorded for the level of technology education the teachers were practicing before being selected as teacher of the year. A second percentile will be recorded as the technological classification the teacher was practicing after being selected for the honor. Finally, a overview of all the surveys will be calculated according to the program the teacher was teaching prior to the award and after the award.

Summary

Compiling the results of the instrument, it may determine the state of technology education programs as taught by ITEA Teacher of the Year recipients. With this data it will be possible to determine the technological classification of Teacher of Year programs when they were selected for the honor. It will also determine if any programmatic changes have been made since being selected as teacher of the year.

CHAPTER IV
FINDINGS

The purpose of this chapter is to report the findings of the research study. The study's purpose was to determine ITEA Teachers of the Year program focus in technology education.

The research instrument used was a survey with three questions concerning the status of their technology education program. The questions were designed from the article "Where Might Our Changes Lead Us?" by John M. Ritz, D.T. E. of Old Dominion University, Norfolk, Virginia. The survey listed the six program options taught within the technology education field. The first question of the survey asked the ITEA Teacher of the Year to check one of the decriptions which best describes his/her program upon their selection as Teacher of the Year. The second question asked these teachers if any changes had occurred in their technology education program since beening selected as ITEA Teacher of the Year . A " yes "or "no" answer was given and if the teacher answered "yes," they were to again select one of the descriptors of technology education that best described their present program. The final question offered the teacher an opportunity to decscribe any major changes they had made in their program since being selected Teacher of the Year. Most of the responses from the teachers were that they changed their program from a tradtional approach to industrial arts to a more design and problem solving concept. Applications and outcomes were also important. Furthermore, emphasis on the impacts technology has on individuals, societies and the enviroment were stressed.

The survey was administered to 110 ITEA Teacher's of the Year for the past three years (1988-1990). The teachers were from throughout the

United States, ranging from middle school/junior high to the high school level. A total of 75 surveys were returned (68 percent).

Status Prior to Being Selected as Teacher of the Year

The following percentages were recorded for question number one, "When selected as ITEA Teacher of the Year which of the following descriptions of Technology Education best described your program." The percentages indicate the program categorization the teachers were teaching when they were selected as ITEA Teacher of the Year. The percentages are taken from the 75 surveys that were returned. The data was calculated by taking the total number of checked descriptors for each survey and dividing the number by the total of surveys returned.

Status Prior to Being Selected as Teacher of the Year		
Program Descriptor	**Total Checked**	**Percentage**
	(N = 75)	
Shop	18	24%
General Industrial Arts	16	21%
Industrial Technology	13	17%
Technological Systems	12	16%
Design and Technology	11	15%
Technology Education	6	7%
TOTAL	75	100%

Table 1

Program Status After Being Selected as Teacher of the Year

The following information was compiled from question number two.: Since being selected as ITEA Teacher of the Year have you changed your Technology Education. The percentages are obtained from teachers who had changed their program since being selected as ITEA Teacher of the Year. The percentages were calculated by taking each checked descriptor for each survey and dividing the number by the total surveys returned.

Program Status After Being Selected as Teacher of Year		
Program Descriptor	**Total Checked**	**Percentage**
	(N = 75)	
Technology Education	21	28%
Industrial Technology	16	22%
Technological Systems	7	9%
Design and Technology	2	2%
Industrial Arts	1	1%
Shop	0	0%
No Change in Program	28	37%
TOTAL	75	100%

Table 2

Program Changes

The final information gathered dealt with a overview of all the surveys dealing with major program changes. The percentages were calculated by taking each survey and using the program the teacher was teaching when he/she was selected for the honor and then taking the program he/she has changed since being selected. After going through all 75 surveys that were returned, there were six major program changes. These are presented in Table 3.

Program Changes		
Program Descriptor	**Total Changed**	**Percentage**
Shop to Industrial Technology	17	23%
Industrial Arts to Technology Ed.	16	21%
Industrial Arts to Technological Systems	6	8%
Design & Technology to Industrial Tech.	5	7%
Technological Systems to Design & Tech.	3	4%
Teachers Did Not Change	28	37%

Table 3

Summary

The findings of the research study were obtained from the survey questions. In Chapter Five of this study the research will be summarized, a conclusion of the data gathered and recommendations of how the research can be of value to the profession.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The problem of this study was to determine International Technology Educational Association Teacher Of The Year recepient program status since being selected as teacher of the year by their individual states.

Summary

This research study has presented a problem that is a valid one in all technology education programs. Technology education programs have been undergoing many changes. Some teachers are following the trend, while others are sticking to their traditional methods. In order to keep pace with this every changing society, programs in technology education must change appropriately. Teachers today are teaching a variety of what we call technology education. Are these various levels of technology education working toward the proper direction? What should we be focusing on in technology education? This study has attempted to determine the current program focus in technology education by surveying ITEA Teachers of the Year in technology education.

The research survey was administered to 110 ITEA Teachers of the Year for the past three years (1988-1990). A total of 68 percent of the surveys were returned.

In Chapter IV, Findings, the actual figures from the data gathered were presented. The figures showed that when the teachers were selected for their honor they were teaching various levels of technology education. Technology education at this point was the lowest percentage. General industrial arts had the highest percentage. Also, the second figures showed that since the teachers were selected for the honor, they have changed more toward a truer technology education program. Furthermore, the final figures showed that a large percentage of teachers who were selected have changed from traditional methods to a industrial technology approach.

Conclusion

The research had showed that a greater percentage of teachers have changed from a general industrial arts program to an industrial technology approach since being selected as ITEA Teacher of the Year. It seems that the technology education programs are more effective in stimulating students' creativity and decision making ability than its forerunner industrial arts. Also, the focus in technology education is toward more of the technological aspects and the impacts that the application of technology has on individuals, societies and the environment.

As a whole, industrial technology scored the highest percentage in program change. Is industrial technology the direction we want for technology education? What do we want our programs to teach? It seems that our profession is directing our programs more toward a technology education approach, but it seems that industrial technology is the program focus being implemented by most of the teachers.

The data showed that 23 percent of the 75 teachers surveyed are moving toward industrial technology. This could be the beginning of further movement toward technology education. At the same time, teachers are learning how technology can be used in the classroom and students can relate it to the real world. Also, the data showed that 21 percent of the teachers are teaching a true technology education program.

But again, seven percent of the teachers are still teaching the traditional methods which they believe are just as good as the new methods.

Recommendations

It is evident when reading this research study and examining its findings that industrial technology and technology education seem to be the programs our profession are working toward. We can conclude that technology education seems to be moving towards a more technological approach. The following are recommendations that should be reviewed by the profession as it moves to modernize its programs.

1. All teachers who are planning to teach technology education programs should be given workshops and seminars on technology education philosophy. At the same time, supervisors should be well informed and educated on the new philosophy. Supervisors should work closely with curriculum development and changes in their programs to ensure adequate materials are available in assisting teachers to implement technology education.

2. The International Technology Education Association should present special workshops and conferences for the ITEA Teachers of the Year on developing a technology education program. ITEA should sponsor the workshops every year to familiarize teachers on what is technology education and what directions should they take. If teachers are not informed on what technology education really is, they may only think they are teaching technology education and may only be teaching a minor part or not teaching it at all.

3. Universities must restructure their teacher preparation programs to ensure graduates are prepared to implement technology education.

BIBLIOGRAPHY

Foy, Ron. "*Industrial Arts-Technology Education: Are We Ready?*" Man/Society/Technology, (May/June 1982), 2.

Johnson, Scott D. "*Making the Transition to Technology Education; Lessons from the Past*," The Technology Teacher (April, 1989), 9-12.

Lauda, Donald P. "*Technology Education and Closing the Gap Between Theory and Practice*, " The Technology Teacher (March, 1984), 3-6.

Lauda, Donald P. "*A Rationale for Technology Education*," Implementing Technology Education, Glencoe Publishing Company, (1986), 15-21.

Ritz, John M. "*Where Might Our Changes Lead Us?*" The Technology Teacher (June,1990), 6-9.

Starkweather, Kendall N. "*The Technology Teacher: Providing a Forum for the Leadership of Industrial Arts / Technology Education*," The Technology Teacher, (September/October 1983), 2.

Stern, Barry E. "*Technology Education as a Component of Fundamental Education*," TheTechnology Teacher, (January, 1991), 3-4.

Wright, Thomas. "*Challenges Facing Educators*," The Technology Teacher (November 1990), 3-5.

APPENDIX
A

POPULATION

Paul	Allen	526 Tammy Street	Decatur	AL	35603
Mark	Anderson	1010 N Prairie Street	Bloomington	IL	61701
Steve	Cook	407 South Cherrywood	West Covina	CA	91791
Silas	Bruner	4229 Morley DR	Colorado SPGS	CO	80916
Dr. John	Williams	108 Dayton DR	Southington	CT	06489
Daniel	Petrino	7864 63rd Way North	Pinellas Park	FL	34665
Roger	Ivey	4994 Lawrenceville HWY	Lilburn	GA	30247
William	Marineau	5004 Harden RD	Moscow	ID	83843
Charles	Swanson	2404 Sunset Lane	Lindenhurst	IL	60046
Tom	Baughman	801 S 8th	Adel	IA	50003
Gerald	Geiser	818 Browns LN	Louisville	KY	40207
Beatrice	Williams	1304 Plaza Dr #A	Baker	LA	70714
John	Kraljic	18 Chapel ST	Ellsworth	ME	04605
Robert	Saunders	22-4 Bayside Dr	Kent Island	MD	21666
Michael	Cerrulo	84 North RD	Chelmsford	MA	01824
Gary	Major	22372 Mintdale Rd	Sturgis	MI	49091
Tom	Gleason	13997 Glenhurst Ave	Savage	MN	55378
Jimmy	Briggs	RT 3, Box 437	Corinth	MS	38834
Ben	Yates	501 Hulen DR	Columbia	MO	65203
Curt	Prchal	2523 Roth Lane	Billings	MT	59102
Larry	Peterson	1605 K	Auburn	NE	68305
Robert	Levin	South Main Street	Wolfeboro	NH	03894
Robert	Garay	Millbrook Ave	Randolph	NJ	07869
Daniel	Peacock	Box 303	Thoreau	NM	87323
John	Hawkins	Route 5 Box 360	Candler	NC	28715
Francis	Harrison	1708 6th Ave NW	Mandan	ND	59554
Ron	Cox	P.O. Box 1094-B RR#5	Yarmouth	NS	00006
Garold	Garrett	3148 Echo Hills	Akron	OH	44313
James	Harder	8113 NW 27th	Bethany	OK	73008
Tom	Ridge	435 Duncan Ave	Washington	PA	15301
Roy	Geigen	P.O. Box 412	Wakefield	RI	02880
Robert	Lake	211 Camille St	Easley	SC	29642
Dan	Wall	Box 581	Parkston	SD	57366
Mike	Wyss	364 Melpar DR	Nashville	TN	37211
Charles	Worley	407 N Parker	Carthage	TX	75633
John	Hall	232 North 600 East	Orem	UT	84057
Tom	Keck	RR #2 Union 32 HI SCH	Montpelier	VT	05602
Patricia	Ways	5152 Lake Shore Rd	Va Beach	VA	23455
Tom	Staly, Jr.	922 S Fruitland	Kennewick	WA	99336
Paul	Kimbrew	114 Boxwood Lane	Fairmont	WV	26554
Pete	McConnell	P.O. Box 347	Wauzeka	WI	53826
Tom	McIntosh	2043 Chestnut	Casper	WY	82601
James	Hinkle	2024 Green Acres Dr	Montgomery	AL	36106
Jim	Fellenberg	5007 E 25th Place	Anchorage	AK	99508
Larry	Lewis	902 Enson	Buckeye	AZ	85326
Robert	Dando	4600 S. Clarkson	Englewood	CO	80110
William	Neidel	1014 Monroe Turnpike	Monroe	CT	06468
Paul	Devine	1400 Gilpin Ave	Wilmington	DE	19806
Horace	Bashinski	1776 Summit Chase Ave	Apopka	FL	32703
Rick	Moore	846 Pine Ridge Dr	Stone Mountain	GA	30087
Phillip	Willey	1800 Bench	Pocatello	ID	83201

Larry	Corey	114 Mercator Dr	Greenwood	IN	46143
Harold	Street	3609 Hillside Dr	Cedar Falls	IA	50613
Thomas	Zerr	# 1 Huron	Hiawatha	KS	66434
Leonard	Greathouse	111 Shaw Ave	Versailles	KY	40383
Matt	Braud	12035 Hwy 431	Stamant	LA	70774
Robert	Cronk	P.O. Box 314	West Southport	ME	04576
Rick	Avondet	8408 Boundbook LA	Alexandria	VA	22309
Arthur	Harrington	17 Anthony St	Adams	MA	01220
Lee	Schaude	4377 Congdon	Williamston	MI	48895
LLoyd	Grandprey	10500 Vessey Rd	Bloomington	MN	55437
Kevin	Ruble	P.O. Box 2000 Teacher	Erueka	MT	59917
Leander	Stachura	7321 Yosemite Dr	Lincoln	NE	68507
Charles	Horsken	South Main St	Wolfeboro	NH	03894
William	Timme	891 Amaryllis Ave	Oradell	NJ	07649
Gary	Shelhamer	77 Beam Hill Rd	Dryden	NY	13053
Warren	Wetmore	70 Kennedy St	Hickory	NC	28601
Rodney	Wiseman	Box 238	Cooperstown	ND	58425
William	Schindley	5833 CO RD 9	Edison	OH	43320
William	Snelson	6613 NW 27th	Bethany	OK	73008
Dan	Jones	1500 NE Penn St	Bend	OR	97701
Sanford	Harrison	3 Highbush Dr	Hilton Head	NC	29928
Hiram	Tate	4565 Andrew Jackson Pkwy	Hermitage	TN	37076
Charles	Kennedy	7821 Cielo Vista	El Paso	TX	79925
Karen	Durfee	10520 So Clearview Dr	Sandy	UT	84070
John	Plas	183 Summer St	Springfield	VT	05156
Dirk	Mroczek	8A Chatfield Dr	Stone Mountain	GA	30083
Stephen	Adams	Rt 1, Box 1270	Lopez	WA	98261
John	Imray	314 15th St	Baraboo	WI	53913
Harold	Bovee	342 W 25th	Torrington	WY	82240
Brian	Webberley	57 Bay Rd Newtown 7008	Hobert, Tasmania	AS	00290
Kenneth	Milner	2 Lingley Lane	St John	NB	00003
Lovie	Crawford	4501 13th Ave N	Birmingham	AL	35212
Ron	Rossman	7864 E Cannon Dr	Scottsdale	AZ	85258
Jose	Sabroso	2275 Ronda Vista Dr	Los Angeles	CA	90027
Peter	Kemp	5 Greenwood Ave	Bethel	CT	06801
Carlos	Cole	4588 Fountain Head Dr	Stone Mountain	GA	30083
Larry	Stevens	1685 Kensington Ave	Hayden Lake	ID	83835
Gerald	Schneider	2004 Parkview Circle	Hoffman Estates	IL	60195
John	Aebi	2400 Pueblo Drive	Lafayette	IN	47905
Alan	Brumbaugh	610 N Maple	Coffeyville	KS	67337
Michael	Ashby	5201 Matterhorn Dr	Lousisville	KY	40212
Donald	Morrissette	15417 Jester Ave	Baton Rouge	LA	70816
Albert	Stone	35 Main St	Northfield	MA	01360
Jeffrey	Grimmer	RR 2, Box 127	Mankato	MN	56001
Jerry	Murphy	Box 152	Gardiner	MT	59030
Anna	Sumner	1239 Yellowstone	Alliance	NE	69301
Marshall	Barrett	P.O. Box 78	Georges Mills	NH	03751
Don	Knepler	243 Crafton Ave	Pitman	NJ	08071
Harry	Berkowitz	278 Sheraden Ave	Staten Island	NY	10314
Andy	Rohwedder	1309 2nd Ave E	Dickinson	ND	58601
BoB	Bauer	2770 Lynn Rd	Kent	OH	44240
Mike	McGarry	1720 Lionsgate Cir	Bethany	OK	73008
John	Niebergall	20075 SW 69th	Tualatin	OR	97062
Lester	Thayer	3905 Fleetwood Dr	West Mifflin	PA	15122
Gerald	Houle	26 Kenyon Hill Trail	Wyoming	RI	02898

Steve	Walker	10609 Macmora	Austin	TX	78758
Nicholas	Heinz	6590 Mechnicsville Pike	Mechanicsville	VA	23111
Charles	Peteshel	Route 3, Box 148	Fairmont	WV	26554
Dan	Nelson	5602 Russett Rd	Madison	WI	53711
Farren	Johnson	Box 429	Mountain View	WY	82939

APPENDIX
B

INSTRUMENT

PERSPECTIVE

Technology Education

Where Might Our Changes Lead Us?

by John M. Ritz, D.T.E.

It appears to be the right time for our discipline to position itself as the subject area that can provide technological literacy to our society. At the National Governors' Association meeting last year, our state leaders adopted educational goals to make our schools second to none. Goal 5 of their agenda focused on Adult Literacy and Lifelong Learning. Within the text of this statement is an objective which reads: "All workers will have the opportunity to acquire the knowledge and skills needed to adapt to constantly emerging new technologies, new work methods, and new markets through public and private vocational, technical, workplace, or other innovative programs" (Education Week, March 7, 1991, p. 16). If we continue to adapt our programs to the changes of technology and the needs of our technological society, we should become the NEW BASIC of education. The question I have and will address is "Can we make the adjustments to make technology education a reality?"

The philosophy for technology education is not new. William E. Warner addressed programs of this nature in his curriculum to reflect technology. Face and Flug and Lux and Ray proposed industrial arts programs which reflected the contemporary industry and technology of the 21st century. DeVore has provided much guidance during the past two decades to make us realize what technology education could become. And during the 70's and 80's, members of our profession have written numerous publications and have discussed their ideas on implementing technology education programs, programs that were much different than their forerunner, industrial arts. In addition, numerous textbooks line our shelves that explain what technology is, and how we can "do" technology in our laboratories.

However, it is few and very, very far between that we can find teachers teaching a "true" technology education program in our schools. Only a few years ago when our associations or state departments wanted to cite model technology education programs, they had problems finding such models. How could they write about, photograph, or send politicians to see these programs? Fortunately for our profession, some excellent programs have emerged. But as I have stated earlier, these are very, very few and far between.

If technology education appears to be the NEW BASIC, why aren't school systems everywhere boasting of their shining examples of these programs? The Sixth Annual Survey of the Profession (Dugger, et. al., 1991, p. 10) shows change is occurring within our profession. However, will we ever reach our goal of a true technology education program? Table 1 of this report contains a listing of the top ten courses being offered in industrial arts/technology education (N=508).

As can be seen, the top courses still remain as unit shop industrial arts courses. Some might call these programs truer reflections of trade and industrial education. When I visit true T & I programs I do not see many differences from our secondary school industrial arts (labeled technology

COURSE	1989–90	CHANGE FROM 1988–89	CHANGE FROM 1987–88	CHANGE FROM 1986–87
Woodworking	38.8%	5.5%	-10.0%	-13.2%
Drafting	38.1%	0.5%	-0.5%	-0.8%
Architectural Drafting	32.3%	-5.3%	+1.4%	+2.2%
Mechanical Drawing	27.8%	-3.3%	+0.9%	+2.5%
General Metals	27.8%	-2.1%	-8.4%	-12.2%
Technology Education	26.1%	+2.3%	+5.5%	+4.5%
Electricity	21.3%	-1.1%	-1.9%	-1.2%
Electronics	21.3%	-0.2%	-0.3%	-4.6%
Manufacturing	21.3%	+1.0%	+1.0%	-0.8%
Communications Technology	21.0%	+2.5%	+4.5%	+4.6%
(N=198)				

Table 1 Top Ten Courses

John M. Ritz, DTE, is a chairman of Graduate Technology at Old Dominion University, Norfolk, VA.

education) programs. If we are teaching mechanical drawing II or wood working III, what distinguishes these from vocational school T & I programs? Aren't we really teaching job skills at this level?

However, some promise can be gleaned from the data in Dugger's report (1991). While most descriptions are of industrial arts courses, they are decreasing in offerings. And to our pleasure, technology education courses have shown statistical increases over data from the past two years.

However, will significant change occur soon enough, or even at all, within our technology education profession? According to Clark (1989):

> Through various means, thousands of administrators, educators, and ancillary staff members have been exposed to technology education. . . Still, the unit shop remains the primary delivery method in the field. . . This serves to accentuate the scope of the crisis, and the professional reaction (or lack thereof) to it. It appears that many efforts in the movement toward technology education have failed because changes have been made in name only, rather than in instructors' understanding of the underlying philosophical differences between industrial arts and technology education (p. 7).

I am aware of school systems that have allocated large financial sums toward the development of their industrial arts faculty hoping to have them become technology teachers. However, as I visit these systems, I find little, if any, progress toward the new philosophy. Have our teachers become lost in the transition, or as Wilkinson (1990, p. 64) summarized, the people in the trenches (classroom teachers) do not have the financial resources or the "practical" guidance of teacher educat rs to help them bridge the gap.

The above instances make me question whether we are making any significant progress toward change. Where are our programs going and will we ever achieve, at a significant level, true programs that reflect the philosophy of technology education? There is much confusion in our field as to what technology education programs are and what must we do to have them. Although thousands have received inservice training and numerous hours have been consumed redesigning curriculums and their accompanying materials, I contend, unacceptably however, that we must realize that various levels of technology education will exist. However, we must set a standard of what we find acceptable for the education of our society.

In recent weeks as I was planning how I would write this article, I received an initial report of an Australian colleague who visited the States in the fall/winter of 1988-89. During his visit, John Holley of the Hawthorn Institute of Education happened to spend three days in my home. His ventures brought him to 22 states and visitations with technology education classrooms, and leaders identified by our professional association. John just did not visit any place; he had recommendations of where to visit to observe technology education firsthand.

In Holley's "Initial Report on USA Study Tour 1988," he indicated that he found various levels of technological study in practice. He labeled these as follows:

1. Industrial Arts—pre-vocational, preparing students for employment.
2. Industrial Arts General—exploring and understanding industrial applications.
3. Industrial Technology—being influenced by career preparation.
4. Technology Education—area of technology which is broad based and includes the study of industrial, agricultural, informational, etc. technologies.
5. Design and Technology—focus on problem solving without much regard to content.
6. Technological Systems—integrating problem solving within the systems content of technology.

Although Holley provided us with a paradigm for viewing transitions toward technology education, his interpretations may be somewhat misleading since his paper did not provide further clarification of his categories. However, he has attempted to show us that confusion exists within our technology education profession. This was a view perceived from an outsider. Therefore, as a profession, we should have concern of how others view our activities.

For a point of departure, I shall attempt to clarify Holley's and my observations of programs that exist in the technology education milieu. Following are six types of technology education or industrial arts programs that can be identified in our nation's schools. These include:

1. Shop—emphasis on material usage and tool skill development. The making of the project is the outcome. Students memorize tools, machine parts, safety rules, types of materials while student activities focus upon the "making" of products.
2. Industrial Arts—development of knowledge and skills of the processes used by industry, i.e. drafting, wood working, metal working, etc.
3. Industrial Technology—modern industrial arts. Focus continues to be on knowledge and skill development through industrial processes. However, these programs bring in the new tools of technology such as computers, CNC mills and lathes, lasers, digital electronics, etc.
4. Design Technology—Originates in the British system of Craft, Design and Technology. Focus is in the development of problem solving skills with technological content becoming secondary.
5. Technical Systems—Study and application of modern systems of communication, construction, manufacturing and transportation. Emphasis is on system resources, applications and outputs.
6. Technology Education—Study and apply the systems of technology including communication, production and transportation. Study includes system design, application and outcomes, however the impacts that the application of technology has on individuals, societies and the environment are also stressed.

As this analysis shows, vast differences do exist in the program outcomes of what the profession is calling technology education. Can we accept all of the above as viable options for technology education in today's schools? If not, which ones are we willing to accept as viable programs?

Furthermore, can we ever expect all localities and teachers to teach level 6 technology education? Or are we asking too much of our colleagues and profession?

One solution to the problem would be to say yes, if you are teaching what I have labeled as level 3, industrial technology, it will be better than what we have done in many places in the past and it is acceptable by our profession. Do a good job at it and we will be proud of you and your efforts. If we buy into this scenario, then we might even recognize this program and possibly label it as "program of the year" in our state. Probably in recent years, programs that have taught a lower level of technology education have been labeled program of the year.

Should we require programs to obtain a level 5 classification, technical systems, before we will acknowledge them as technology education and be worthy of recognition? Or, will we be unsettled until all programs reach level 6, technology education?

Continued on page 12

5. Internal Technology Education Association: *Technology Education in Action Outstanding Programs.* ITEA, 1989
6. National Center for Educational Statistics: *1990 Education Indicators.* U.S. Department of Education, 1990
7. *National Education Goals: A Report to the Nation's Governors.* The White House, 1990
8. National Governor's Association; *Educating America: State Strategies for Achieving the National Education Goals.* NGA, 1990
9. *Omnibus Trade and Competiveness Act of 1988.* (Public Law 100-418)
10. Parnell, Dale: *The Neglected Majority,* Washington, DC, The Community College Press, 1985
11. Perelman, Lewis J.: *Technology and Transformation of Schools: Public Education Strategies for a More Competitive Nation.* Version 1.1—March, 1987
12. Stern, Barry: *New Directions for Vocational Education: Implications for Data Programs, Career Guidance and Counseling.* Speech to the Thirteenth Annual National State Occupational Information Coordinating Committee, August 1990
13. Technology Education Advisory Council: *A National Imperative.* ITEA, 1988

Dr. Stern is Deputy Assistant Secretary of Vocational and Adult Education at the U.S. Department of Education.

Continued from page 4

I feel that these are decisions that our profession must come to grips with, if we are to provide the education that our governors are looking for as we move into the 21st century: "to acquire the knowledge and skills needed to adapt to constantly emerging technologies." We can probably achieve this goal through industrial technology programs, but are we doing enough for our society if we accept this level of technology education?

References

Clark, S. (Fall 1989). The industrial arts paradigm: adjustment, replacement or extinction? Journal of Technology Education, pp. 7–21.

Dugger, W., et. al. (January 1991). Sixth annual survey of the profession. The Technology Teacher, pp. 10–14.

Holley, J. (April 1989). Professional experience program report, initial report on USA study tour 1988, Unpublished manuscript.

Text of Statement of Education Goals Adopted by Governors. (March 7, 1990). Author: Education Week, pp. 16–17.

Wilkerson, P. (Spring 1990). Tubal cain and all that. Journal of Technology Education, pp. 64–66.

Editor's Note
The following reference was omitted from the article, "A Conceptual Framework for Technology Education Part 2," by Ernest Savage and Leonard Sterry, *The Technology Teacher,* November 1991, Vol. 50, No. 2, pp. 7–11. "Practial Implications for the Study of Technology," p. 8, should have been cited from "A Philosophical Framework for Understanding Technology," by Rodney Frey, *Journal of Industrial Teacher Education,* Fall 1989, Vol. 27 No. 1, pp. 23–25.

APPENDIX
C

COVER LETTER

OLD DOMINION UNIVERSITY

Department of Occupational and Technical Studies
Norfolk, Virginia 23529

address

Dear Mr./Ms.

)ffice of the Chair
804) 683-4305

Adult Education
683-3307

;raduate Vocational
:ducation
683-4305

Marketing Education
'raining Specialist
'ashion
683-3307

Technology Education
ndustrial Technology
583-4305

In recent years Technology Education has undergone many changes. We have moved our programs from general shop to programs that provide technological literacy. In order to better understand these changes, I am trying to determine what International Technology Education Association Teachers of the Year recipients feel toward program change in Technology Education.

To do this, a survey is being distributed to all ITEA Teachers of the Year for the pass three years (1989-1991). The questions were developed from a perspective article that appeared in The Technology Teacher, February 1991. Ritz observed that six types of programs existed within this relm of technology education. I am attempting to determine how you would classify your program when you were selected Teacher of the Year and what changes, if any, you made since you received this honor.

Please complete and return the enclosed survey by May 31, 1991 to insure that your response is included in the results of this study. There is a self addressed stamped envelope enclosed for your convenience. I thank you in advance for assisting me in this information gathering process.

Sincerely,

Kevin W. Wong
Graduate Teaching Assistant

Dr. John Ritz, DTE
Professor and Chairman

kww/ej

Enclosure

APPENDIX
D

SURVEY

Survey For International Technology Education Association

Teacher of the Year Recipients

Purpose:	**To determine ITEA Teachers of the Year program focus in Technology Education.**
Directions:	**CAREFULLY read the following program descriptor. Answer the following questions as accurately as possible. Where requested, please add any additional comments you may feel are relevant to the question(s).**

When selected as ITEA Teacher of the Year which of the following descriptions of Technology Education **best** described your program (check only one)?

Since being selected as ITEA Teacher of the Year have you changed your Technology Education? ☐ YES ☐ NO If yes, which description **best** describes your program now:

☐ ☐ My program reflects the British system of designed and problem solving. Its focus is on the development of problem solving skills.

☐ ☐ My program emphasizes material usage and tool skill development. The making of the project is the primary focus. Students use tools, memorize machine parts and safety rules. Student activities focus upon the production of products.

☐ ☐ My program focuses on the development of knowledge and skills of the processes used by industry. Some examples are of content studied are drafting, woodworking and metal working.

☐ ☐ My program emphasizes the study communication, production and transportation systems. The study includes systems design, application and outcomes. The impacts that the application of technology has on individuals, societies and the enviroment are stressed.

☐ ☐ My program consists of the study of modern systems of communication, construction manufacturing and transportation. Emphasis is on system resources, application, and outputs.

☐ ☐ My program emphasized industrial technology. The focus is on knowledge and skill development associated with industrial processes. The programs bring in the new tools of technology such as computers, CNC mills and lathes, lasers, and digital electronics.

Since being selected as ITEA Teacher of the Year, describe the major changes you have made with your program. (Additional comments can be made on the back of this page)

____

____

____

____