

2005

Tidewater Virginia Technology Education Teacher Professional Development Needs

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**TIDEWATER VIRGINIA TECHNOLOGY EDUCATION
TEACHER PROFESSIONAL DEVELOPMENT NEEDS**

A Research Project

**Presented to the Graduate Faculty of the Department of
Occupational and Technical Studies
Old Dominion University**

**In Partial Fulfillment of the Requirements for the Masters of Science in
Occupational and Technical Studies**

By

Richard A. Nash

August 2005

SIGNATURE PAGE

Richard Austin Nash prepared this research study under the direction of Dr. John M. Ritz in OTED 636, Problems in Occupational and Technical Studies, at Old Dominion University. It was submitted to the Graduate Program Director as partial fulfillment of the requirements for the degree of Master of Science in Occupational and Technical Studies.

Approved by: John M. Ritz Date: 8-1-05

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CHAPTER I

INTRODUCTION

Quality teachers have been found to be one of the single greatest factors in student achievement (Teacher Professional Development, 2004). Teacher education, ability, and experience have been found to be a greater determinant in student success than all other factors (Teacher Professional Development, 2004). The teacher knowing the subject matter, understanding how students learn, and practicing effective teaching methods lead to greater student achievement (Teacher Professional Development, 2004). It is vital that teachers are well prepared when they begin teaching and that they continue to improve through professional development (Teacher Professional Development, 2004).

All teachers should seek to maintain personal and professional competence through undertaking structured professional development (Professional Development, 2004). School systems should seek to create an environment, which encourages and enables educators to remain professionally competent throughout their teaching careers (Professional Development, 2004). As a Technology Education graduate student, the researcher has a personal interest in determining the need for professional development by technology education teachers in Tidewater Virginia public school systems.

STATEMENT OF THE PROBLEM

The problem of this study was to determine the perceived need for professional development of public school technology education teachers in Tidewater Virginia school systems.

RESEARCH OBJECTIVES

The following objectives were established to answer this problem:

1. Determine the types of professional development being sought by Tidewater public school technology education teachers.
2. Recommend specific types of professional development that should be made available to Tidewater technology education teachers.

BACKGROUND AND SIGNIFICANCE

Teacher professional development is defined as a continuous process of lifelong learning and growth that begins early in life, continues through the undergraduate, pre-service experience, and extends through the in-service years (Advancing Excellence in Technological Literacy, 2003). In 1957, the In-service Education 56th Year Book was written by E. Henry (Lieberman, 1995). The importance of the book was the challenge it made to the assumptions of in-service education that had dominated the 20th century (Lieberman, 1995). Henry proposed that schools and entire staffs should collaborate on education (Lieberman, 1995). The conflicting assumptions that teachers develop mainly through direct teaching, rather than being involved in helping to define and shape teaching, is at the core of professional development in this era (Lieberman & Miller, 1992).

The current national school reform effort is seeking to develop not only new conceptions of teaching and learning, but also a greater variety of practices that support teacher professional development (Lieberman, 1995). While there is still no set of concrete directions for implementing full teacher professional development, some schools

have already experienced successes when professional development was incorporated as an integral part of school reform (Lieberman, 1995). For example, some school organizational changes put new and experienced teachers together to learn from one another (Lieberman, 1995). The biggest changes for teacher professional development is when, the content of curriculum, the context of each classroom within the school, and the context of the school itself, are all considered with regard to teacher participation in decision-making (Lieberman, 1995).

As teacher professional development moves from the traditional in-service learning to long-term, within the context of the classroom with colleague support, the opportunities increase dramatically (Lieberman, 1995). If teacher learning takes place within the context of a professional community that is developed from the inside and outside of the school, the effects may not only be expanded teacher professional development, but significant and lasting school change (Lieberman, 1995).

LIMITATIONS

The following limitations were followed during this study:

1. The survey of technology education teachers in the Tidewater Virginia schools will be under taken prior to the end of the 2005 regular school year.
2. Only technology education teachers in Tidewater Virginia school systems will be surveyed.

ASSUMPTIONS

This study was based upon the following assumptions:

1. Tidewater Virginia technology education teachers are not familiar with the International Technology Education Association (ITEA) Standards for Technological Literacy.
2. Tidewater Virginia technology education teachers are not familiar or have not heard of the International Technology Education Association's Professional Development Standards.
3. There are a limited number of Tidewater technology education teachers seeking graduate study programs to enhance their careers.
4. There are a limited number of Tidewater technology education teachers who attend the Virginia Technology Education Association summer or regional professional development activities.

PROCEDURES

The researcher will distribute professional development surveys to Tidewater Virginia technology education teachers during the 2005 school year. The surveys will be used to determine the perceived professional development needs of Tidewater Virginia technology education teachers.

DEFINITION OF TERMS

The following terms are defined to assist the reader:

1. ITEA- International Technology Education Association

2. Mission of Professional Development- is to prepare and support educators to help all students achieve to high standards of learning and development (Achieving the Goals, 1996).
3. Core Curriculum- subjects that every child must study throughout their period of compulsory schooling - these subjects are English, Mathematics, and Science (AGS Publishing, 2004).
4. Standardization- In test administration, maintaining a constant testing environment, and conducting the test according to detailed rules and specifications, so that testing conditions are the same for all test takers (AGS Publishing, 2005).
5. Professional Development- A continuous process of lifelong learning and growth that begins early in life, continues through the undergraduate, pre-service experience, and extends through the in-service years (Advancing Excellence in Technological Literacy, 2003).
6. Collaborative learning- An instructional approach in which students of varying abilities and interests work together in small groups to solve a problem, complete a project, or achieve a common goal (North Central Regional Educational Laboratory, 2004).
7. Metacognition- The process of considering and regulating one's own learning. Activities include assessing or reviewing one's current and previous knowledge, identifying gaps in that knowledge, planning gap-filling strategies, determining the relevance of new information, and potentially revising beliefs on the subject (North Central Regional Educational Laboratory, 2004).

OVERVIEW OF CHAPTERS

In Chapter I, the researcher sought to familiarize the reader with the topic of educator's professional development. Teacher professional development consists of undergraduate studies, pre-service experiences, in-service experiences, and post-graduate studies. Teacher professional development should be an integral part of education reform. In the forth coming chapters the researcher will present information on the research of others relating to educator professional development, information on the process and instrument used to gather data on the professional development needs of Tidewater Virginia technology teachers, presentation of findings resulting from survey data, and conclusions and recommendations based on analysis of the data collected.

CHAPTER II

REVIEW OF LITERATURE

This chapter will define and explore the evolution of teacher professional development. Professional development standards for technology education teachers will be introduced and explained.

PROFESSIONAL DEVELOPMENT

What is educator professional development? The 1957 publication, *In-Service Education, 56th Year-Book*, included all activities engaged in by educators during their service that contributed to improved job performance (Henry, 1957). The prominent scholar and educator Lieberman defined educator professional development as knowledge, skills, abilities, and necessary conditions for teacher learning on the job (Lieberman & Miller, 1992). Early teacher professional development researchers and writers listed the following as critical components of professional development: maintenance and familiarity with new knowledge and subject matter, knowledge of teaching methods, utilizing community resources, and building professionalism and high morale (Henry, 1957).

Educators must constantly seek to become familiar with new developments that are relevant to their field. The English teacher must be familiar with important new books, the social studies teacher must keep abreast of current affairs, and the science teacher must be informed of new discoveries and the resulting implications (Henry, 1957).

Teachers utilize many different teaching methods depending on existing realities of the classroom and the student. These realities require classroom management skills, selecting and organizing teaching materials, and planning group activities. What may have worked for one particular grade and class last year may no longer be appropriate for the same class this year (Henry, 1957).

Teachers should strive to utilize and integrate with the local community. Interviews, field trips, surveys, and work-experience activities have all been used by successful schools as methods of relating their programs usefulness in improving the local community (Henry, 1957).

Successful educator professional development requires that educators have profound convictions in the value of their work. Teachers must feel their profession has significant positive impact on students who in turn have significant impact on society. When school systems fail to provide adequate professional development, teachers lose enthusiasm, their morale suffers, and they no longer use their abilities fully (Henry, 1957).

In the book, *Professional Development of Teachers*, Hoyle wrote that a comprehensive program of professional development should include three functions: an adequate system of in-service training for teachers, support of schools to enable program improvement, and creation of context in which teachers are enabled to develop to their full potential (Hoyle & Megarry, 1980). Hoyle's professional development components of training included presentation of theory, modeling or demonstrations of skills, practice in simulated and classroom settings, structured feedback, open-ended feedback, and coaching for application (Hoyle & Megarry, 1980).

During the last four decades, there have been numerous changes in the research and practice of educator professional development. During the 1950s, the main focus for professional development was on the group and the importance of group cohesion, group work, collaborative research, and the role of the trainer. The 1960s saw a shift in professional development focusing on teacher subject-matter mastery in response to perceived threats posed by the Soviets. Society demanded U.S. public school students not fall behind their Soviet counterparts. During the 1970s and 1980s, the process-product and generic teaching traditions in research dominated. This research relied on codifying teacher behaviors and correlating them to student achievement and structuring a scientific basis for teaching (Lieberman & Miller, 1992).

TECHNOLOGY EDUCATION PROFESSIONAL DEVELOPMENT

The International Technology Education Association (ITEA) published professional development standards for technology education teachers in 2003.

The following are the ITEA Professional Development Standards:

1. Professional development will provide teachers with knowledge, abilities, and understanding consistent with *Standards for Technological Literacy: Content for the Study of Technology (STL)*.
2. Professional development will provide teachers with educational perspectives on students as learners of technology.
3. Professional development will prepare teachers to design and evaluate technology curricula and programs.

4. Professional development will prepare teachers to use instructional strategies that enhance technology teaching, student learning, and student assessment.
5. Professional development will prepare teachers to design and manage learning environments that promote technological literacy.
6. Professional development will prepare teachers to be responsible for their own continued professional growth.
7. Professional development providers will plan, implement, and evaluate the pre-service and in-service education of teachers (*Advancing Excellence in Technological Literacy*, 2003).

The guidelines for meeting ITEA's Professional Standard One (PD-1) require that professional development providers consistently prepare teachers to understand the nature of technology, recognize the relationship between technology and society, know the attributes of design, develop abilities for a technological world, and develop proficiency in the designed world (*Advancing Excellence in Technological Literacy*, 2003).

The guidelines for meeting ITEA's PD-2 require that professional development providers consistently prepare teachers to incorporate student commonality and diversity to enrich learning, provide cognitive, psychomotor, and affective learning opportunities, assist students in becoming effective learners, and conduct and use research on how students learn technology (*Advancing Excellence in Technological Literacy*, 2003).

The guidelines for meeting ITEA's PD-3 require that professional development providers consistently prepare teachers to:

1. Design and evaluate curricula and programs that enable all students to attain technological literacy.
2. Design and evaluate curricula and programs across disciplines.
3. Design and evaluate curricula and programs across grade levels.
4. Design and evaluate curricula and programs using multiple sources of information (*Advancing Excellence in Technological Literacy*, 2003).

The guidelines for meeting ITEA's PD-4 require that professional development providers consistently prepare teachers to coordinate instructional strategies with curricula, incorporate educational (instructional) technology, and utilize student assessment (*Advancing Excellence in Technological Literacy*, 2003).

The guidelines for meeting ITEA's PD-5 require that professional development providers consistently prepare teachers to design and manage learning environments that operate with sufficient resources; design and manage learning environments that encourage, motivate, and support student learning of technology; design and manage learning environments that accommodate student commonality and diversity; design and manage learning environments that reinforce student learning and teacher instruction; design and manage learning environments that are safe, appropriately designed, and well-maintained; design and manage learning environments that are adaptable (*Advancing Excellence in Technological Literacy*, 2003).

The guidelines for meeting ITEA's PD-6 require that professional development providers consistently prepare teachers to assume commitment to self-assessment and responsibility for continuous professional growth, establish a personal commitment to ethical behavior within the educational environment as well as in private life, facilitate

collaboration with others, participate in professional organizations, serve as advisors for technology student organizations, and provide leadership in education (*Advancing Excellence in Technological Literacy*, 2003).

The guidelines for meeting ITEA's PD-7 require that professional development providers consistently plan pre-service and in-service education for teachers; model teaching practices that teachers will be expected to use in their laboratory-classrooms; evaluate professional development to assure that the needs of teachers are being met; support technology teacher preparation programs that are consistent with state/provincial/regional and national/federal accrediting guidelines; provide teacher preparation programs leading to licensure that are consistent with *Advancing Excellence in Technological Literacy* and *Standards for Technological Literacy*; provide in-service activities to enhance teacher understanding of technological content, instruction, and assessment; obtain regular funding for in-service professional development opportunities; and create and implement mentoring activities at both in-service and pre-service levels (*Advancing Excellence in Technological Literacy*, 2003).

Teacher professional development is vital for preparing teachers to teach technology. The ITEA's professional development standards provide key benchmarks to guide and assess the level of technology educator professional development.

SUMMARY

The Review of Literature focused on the evolution of educator professional development from the 1950s through the 1990s and ending with ITEA's seven professional development standards. Teacher professional development must be

adaptable to changing curricula and practices and be able to incorporate new technological developments (*Advancing Excellence in Technological Literacy*, 2003).

Some technology teachers exist with little professional development support and little incentive to improve their teaching practices. Some of the best professional development results have been achieved when, teachers are given the opportunities to share information with colleagues, work with colleagues to plan curricula, and have the authority to implement changes relating to the way the needs of students are met (*Advancing Excellence in Technological Literacy*, 2003).

In Chapter III, the researcher will explain the methods and procedures used to determine the perceived professional development needs of Tidewater Virginia technology education teachers. The instrument for determining teacher professional development needs will be a survey.

CHAPTER III

METHODS AND PROCEDURES

Chapter III contains the Methods and Procedures used in this descriptive research study. The focus of the study was to determine the professional development needs of Tidewater Virginia technology education teachers. The instrument used to determine these needs was a survey. The survey was composed of questions about teaching experience, grade level taught, and professional development needs.

POPULATION

The problem of the study focused on the professional development needs of Tidewater Virginia technology education teachers. The population under study was composed of 147 middle school and high school technology education teachers from the Chesapeake, Virginia Beach, Norfolk, and Portsmouth Public School Systems.

INSTRUMENT DESIGN

The instrument used to obtain technology education teacher professional development data was a survey. One part of the survey contained questions about the grade level currently taught and years of school system experience. The second part of the survey dealt with the teachers perceived professional development needs. The professional development section was designed in the form of statements, preceded by a check box, for the teacher to place a mark if the statement represented a perceived need.

METHODS OF DATA COLLECTION

The methods of data collection in the study consisted of electronically mailing a cover letter to solicit cooperation and assure confidentiality, and a survey as an attachment, to gather the necessary data, to the email accounts of technology education teachers in the Tidewater Virginia area. Follow-up letters along with a new copy of the survey as an attachment were electronically sent as reminders to teachers whose surveys had not been returned within one week of the initial emailing to encourage participation. A third follow-up request was electronically sent two weeks after the initial request along with an attached survey to the technology teachers that had not responded.

STATISTICAL ANALYSIS

The survey was designed to determine the perceived professional development needs of Tidewater Virginia technology education teachers using closed-form responses to facilitate the tabulation and analysis of data and to improve the reliability and consistency of data. The other portion of the survey contains questions about the grade level currently taught, and years of technology teaching experience. The data will be analyzed using number and percentages of response.

SUMMARY

Chapter III charted the methods and procedures used in this professional development study. To acquire the necessary data, a professional development survey and cover letter were developed. The cover letter and survey were electronically sent by email to Tidewater Virginia technology education teachers in Chesapeake, Virginia

Beach, Norfolk, and Portsmouth. Non-respondents were electronically sent follow-up letters along with another copy of the survey to encourage participation. The returned surveys were analyzed and the results are presented in Chapter IV.

CHAPTER IV

FINDINGS

The purpose of Chapter IV is to present the reader with information derived from the research survey. The problem of this study was to determine the perceived need for professional development of public school technology education teachers in Tidewater Virginia school systems. The first items presented are the number of surveys sent to each Tidewater Virginia school system and the number and percentage of surveys returned by each system. The survey was divided into three areas of concern. The first area of concern was the grade level taught and the years of experience teaching technology education. The second area of concern was identifying the different technological subject areas in which the teacher felt a need for more education and training. The third area of concern dealt with the International Technology Education Association's Professional Development Standards for technology teachers.

POPULATION RESPONSE

One-hundred-forty-seven surveys were electronically sent to Tidewater technology teachers in the Chesapeake, Norfolk, Portsmouth, and Virginia Beach Public School Systems. Fifty-two surveys were sent to Chesapeake technology teachers and 12 surveys were returned for a response rate of 23 percent. Twenty-five surveys were sent to Norfolk technology teachers and 13 surveys were returned for a response rate of 52 percent. Sixteen surveys were sent to Portsmouth technology teachers and four were returned for a response rate of 25 percent. Fifty-four surveys were sent Virginia Beach technology teachers and 23 were returned for a response rate of 43 percent. The overall

response rate for the survey was 36 percent. The population response survey data are presented in Table 1.

Table 1: Population Response

Tidewater Virginia School Systems	Total Sent	Total Response	Percentage of Response
Chesapeake	52	12	23
Norfolk	25	13	52
Portsmouth	16	4	25
Virginia Beach	54	23	43
Totals	147	52	36

GRADE LEVEL AND EXPERIENCE

The first part of the survey was concerned with the current grade level taught and the number of years of individual technology teaching experience. Ten of 52 or 19% of the respondents taught middle school. Forty-two of 52 or 81% taught high school. Of those 52 surveyed, 49 responded to the question regarding experience with the following results: Four of 49 or eight percent had been teaching technology for one year or less; ten of 49 or 20% had less than five years of technology teaching experience; 15 of 49 or 31% had between five and ten years of technology teaching experience; eight of 49 or 16% had more than ten years but less than twenty years of technology teaching experience; and 12 of 49 or 24% of respondents had more than twenty years of technology teaching experience. Three of the respondents failed to make a selection in the number of years of teaching experience. The years of teaching experience survey data are presented in Table 2.

Table 2: Years of Teaching Experience

Years of Teaching Experience	Number of Teachers	Percentage of Teachers
One or less	4	8
Less than five	10	20
Between five and ten	15	31
More than ten, less than 20	8	16
More than 20	12	24
Totals	49	99

TECHNOLOGY SUBJECT AREAS

The second part of the survey identified technological subject areas where the respondents felt a need for more education and training. The following were the results from the 52 respondents who felt that they needed additional education and training in the following technology areas: 3-D Modeling, 15 of 52 or 29%; Animation Technology, 30 of 52 or 58%; Automated Systems/Control Technologies, 11 of 52 or 21%; Bioengineering, 16 of 52 or 31%; Biotechnology, 15 of 52 or 29%; Computer Aided Machines (CAM), 17 of 52 or 33%; Computer Integrated Manufacturing (CIM), 12 of 52 or 23%; Computer Aided Drawing/Design (CAD), 16 of 52 or 31%; Energy Resources, eight of 52 or 15%; Digital Images, 18 of 52 or 35%; Digital Multimedia, 22 of 52 or 42%; Electronics, 12 of 52 or 23%; Engineering Design, 11 of 52 or 21%; Geo-spatial Technologies (GIS, GPS ,etc.), 18 of 52 or 35%; Graphic Communications Technology, 14 of 52 or 27%; Graphic Production, 12 of 52 or 23%; Internet Fundamentals, five of 52 or 10%; Imaging Technologies, 15 of 52 or 29%; Manufacturing Automated Systems and Technologies, four of 52 or 8%; Media and Video Technology, 18 of 52 or 35%;

- Microcomputer Fundamentals, seven of 52 or 13%; Network Fundamentals ten of 52 or

19%; Optic and Laser Systems, 20 of 52 or 38%, Power and Transportation, four of 52 or 8%; Robotic Systems, 16 of 52 or 31%; Technological Assessment, six of 52 or 12%; and Web Page Design, 20 of 52 or 38%. The technology subject area survey data are presented in Table 3.

Table 3: Technology Subject Areas

Technology Subject Areas	Total Number Choosing Subject Area	Total Number of Respondents	Percentage Choosing Subject area
3D Modeling	15	52	29
Animation Technology	30	52	58
Automated Systems and Control Technology	11	52	21
Bioengineering	16	52	31
Biotechnology	15	52	29
Computer Aided Machines (CAM)	17	52	33
Computer Integrated Manufacturing (CIM)	12	52	23
Computer Aided Drawing/Design (CAD)	16	52	31
Energy Resources	8	52	15
Digital Images	18	52	35
Digital Multimedia	22	52	42
Electronics	12	52	23
Engineering Design	11	52	21
Geo-Spatial Technologies (GIS, GPS, etc.)	18	52	35
Graphic Communication Technologies	14	52	27
Internet Fundamentals	5	52	10

Imaging Technologies	15	52	29
Manufacturing Automated Systems and Technologies	4	52	8
Media and Video Technologies	18	52	35
Micro-Computer Fundamentals	7	52	13
Network Fundamentals	10		19
Optic and Laser Systems	20	52	38
Power and Transportation	4	52	8
Robotic Systems	16	52	31
Technological Assessment	6	52	12
Web Page Design	20	52	38

PROFESSIONAL DEVELOPMENT STANDARDS

The third part of the survey consisted of categories three through eight. Each of these categories were taken from the International Technology Education Association's (ITEA) *Standards for Technological Literacy*; Professional Development Standards. Each of these standards was subdivided into related statements in which the respondents could choose whether more professional development was needed to increase their teaching competence.

Category three was concerned with "Standards for Technological Literacy" and was subdivided into five statements. The first statement, "Understand the nature of technology (know the characteristics, scope, and core concepts of technology and understand how they permeate all technologies)," was chosen by nine of 52 respondents or 17%. The second statement, "Recognize the relationship between technology and

society,” was chosen by nine of 52 respondents or 17%. The third statement, “Apply the attributes of design,” was chosen by 13 of 52 respondents or 25%. The fourth statement, “Develop the abilities to use and maintain technological products and systems within a laboratory setting,” was chosen by 18 of 52 respondents or 35%. The fifth statement, “Understand how the designed world uses resources, materials, machine tools, people, information, energy, capital, and time in the development of products and systems,” was chosen by 12 of 52 respondents or 23%. The “Standards of Technological Literacy,” survey data are presented in Table 4.

Table 4: Standards of Technological Literacy

Standards for Technological Literacy	Total Number Choosing Subject Area	Total Number of Respondents	Percentage Choosing Subject area
Understand the nature of technology (know the characteristics, scope, and core concepts of technology and understand how they permeate all technologies).	9	52	17
Recognize the relationship between technology and society.	9	52	17
Apply the attributes of design	13	52	25
Develop the abilities to use and maintain technological products and systems within a laboratory setting.	18	52	35
Understand how the designed world uses resources, materials, tools, people, information, energy, capital, and time in the development of products and systems.	12	52	23

Category four was concerned with “Educational Perspectives on Students as Learners of Technology” and was subdivided into four statements. The first statement, “Recognize students similarities and differences, including cultures, interest, socio-economic backgrounds, and special needs,” was chosen by nine of 52 respondents or 17%. The second statement, “Provide cognitive, psychomotor, and affective learning opportunities (knowing plus doing equals understanding),” was chosen by 11 of 52 respondents or 21%. The third statement, “Develop learning activities that appeal to student interest and challenge students to reflect on practical experiences,” was chosen by 37 of 52 respondents or 71%. The fourth statement, “Conduct and use research on how students learn technology and how you can show that taking a technology education course really makes a difference in students’ lives,” was chosen by 19 of 52 respondents or 37%. The “Educational Perspectives on Students as Learners of Technology,” survey data are presented in Table 5.

Table 5: Education Perspectives on Students as Learners of Technology

Educational Perspectives on Students as Learners of Technology	Total Number Choosing Subject Area	Total Number of Respondents	Percentage Choosing Subject area
Recognize students similarities and differences, including cultures, interest, socio-economic backgrounds, and special needs.	9	52	17
Provide cognitive, psychomotor, and affective learning opportunities (knowing plus doing equals understanding).	11	52	21

Develop learning activities that appeal to student interests and challenge students to reflect on practical experiences	37	52	71
Conduct and use research on how students learn technology and how you can show that taking a technology education course really makes a difference in student's lives.	19	52	37

Category five was concerned with, “Design and Evaluate Technology Curricula and Programs,” and was subdivided into four statements. The first statement, “Design and evaluate curricula and programs that enable all students to attain technological literacy,” was chosen by 19 of 52 respondents or 37%. The second statement, “Design and evaluate curricula and programs across disciplines,” was chosen by 21 of 52 respondents or 40%. The third statement, “Design and evaluate curricula across grade levels,” was chosen by 13 of 52 respondents or 25%. The fourth statement, “Design and evaluate curricula and programs using multiple sources of information,” was chosen by 19 of 52 respondents or 37%. The “Design and Evaluate Technology Curricula and Programs,” survey data are presented in Table 6.

Table 6: Design and Evaluate Technology Curricula and Programs

Design and Evaluate Technology Curricula and Programs	Total Number Choosing Subject Area	Total Number of Respondents	Percentage Choosing Subject area
Design and evaluate curricula and programs that enable all students to attain technological literacy.	19	52	37

Design and evaluate curricula and programs across disciplines.	21	52	40
Design and evaluate curricula across grade levels	13	52	25
Design and evaluate curricula and programs using multiple sources of information.	19	52	37

Category six was concerned with, “Use Instructional Strategies that Enhance Technology Teaching, Student Learning, and Student Assessment,” and was subdivided into three statements. The first statement, “Coordinate instruction and curricula so that technological content is delivered effectively to maximize student learning,” was chosen by 28 of 52 respondents or 54%. The second statement, “Develop abilities to use computers, audio-visual equipment, and mass media, as tools for enhancing and optimizing the learning environment,” was chosen by 21 of 52 respondents or 40%. The third statement, “Utilize student assessment as a method for enhancing learning and modifying instruction,” was chosen by 15 of 52 respondents or 29%. The “Use Instructional Strategies that Enhance Technology Teaching, Student Learning, and Student Assessment,” survey data are presented in Table 7.

Table 7: Use Instructional Strategies that Enhance Technology Teaching, Student Learning, and Student Assessment

Use Instructional Strategies that Enhance Technology Teaching, Student Learning, and Student	Total Number Choosing Subject Area	Total Number of Respondents	Percentage Choosing Subject area
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Assessment			
Coordinate instruction with curricula so that technological content is delivered effectively to maximize student learning.	28	52	54
Develop abilities to use computers, audio-visual equipment, and mass media, as tools for enhancing and optimizing the learning environment.	21	52	40
Utilize student assessment as a method for enhancing learning and modifying instruction.	15	52	29

Category seven was concerned with, “Design and Manage Laboratory-Classrooms that are Learner Centered and Adaptable for Hands-On Experiences,” and was subdivided into six statements. The first statement, “Design and manage learning environments that operate with sufficient resources (local community resources, donations from business and industry, and using recycled materials/equipment),” was chosen by 21 of 52 respondents or 40%. The second statement, “Design and problem solving are presented as key activities and processes in the study of technology,” was chosen by 22 of 52 respondents or 42%. The third statement, “Design and manage learning environments that accommodate student commonality and diversity,” was chosen by 12 of 52 respondents or 23%. The fourth statement, “Design and manage learning environments that establish high expectations for technological learning,” was chosen by 14 of 52 respondents or 27%. The fifth statement, “Design and manage learning environments that are safe, appropriately designed, and well maintained,” was chosen by 13 of 52 respondents or 25%. The sixth statement, “Design and manage learning environments that are adaptable,” was chosen by seven of 52 respondents or

13%. The “Design and Manage Laboratory-Classrooms that are Learner-Centered and Adaptable for Hands-On Experiences,” survey data are presented in Table 8.

Table 8: Design and Manage Laboratory-Classrooms that are Learner-Centered and Adaptable for Hands-On Experiences

Design and Manage Laboratory-Classrooms that are Learner-Centered and Adaptable for Hands-On Experiences.	Total Number Choosing Subject Area	Total Number of Respondents	Percentage Choosing Subject area
Design and manage learning environments that operate with sufficient resources (Local community resources, donations from business and industry, and using recycled materials/equipment).	21	52	40
Design and problem solving are presented as key activities and processes in the study of technology.	22	52	42
Design and manage learning environments that accommodate student commonality and diversity.	12	52	23
Design and manage learning environments that establish high expectations for technological learning.	14	52	27
Design and manage learning environments that are safe, appropriately designed, and well maintained.	13	52	25
Design and manage learning environments that are adaptable.	7	52	13

Category eight was concerned with, “Prepared to Be Responsible for Continued Professional Growth,” and was subdivided into six statements. The first statement, “Assume commitment to self-assessment and responsibility for continuous professional growth, i.e., become Nationally Board Certified,” was chosen by 17 of 52 respondents or 33%. The second statement, “Establish a personal commitment to ethical behavior within the educational environment,” was chosen by seven of 52 respondents or 13%. The third statement, “Develop abilities to effectively collaborate with peers and others in the school community,” was chosen by 15 of 52 respondents or 29%. The fourth statement, “Participate in professional organizations related to technology education,” was chosen by 16 of 52 respondents or 31%. The fifth statement, “Serve as an advisor for technology student organizations,” was chosen by nine of 52 respondents or 17%. The sixth statement, “Participate in school, community, and political efforts to create positive change in technology education programs,” was chosen by 16 of 52 respondents or 31%. The “Prepared to Be Responsible for Continued Professional Growth,” survey data are presented in Table 9.

Table 9: Prepared to Be Responsible for Continued Professional Growth

Prepared to Be Responsible for Continued Professional Growth.	Total Number Choosing Subject Area	Total Number of Respondents	Percentage Choosing Subject area
Assume commitment to self-assessment and responsibility for continuous professional growth, i.e., become Nationally Board Certified.	17	52	33
Establish a personal	7	52	13

commitment to ethical behavior within the educational environment			
Develop abilities to effectively collaborate with peers and others in the school community.	15	52	29
Participate in professional organizations related to technology education.	16	52	31

SUMMARY

The survey contained three areas of concern. The first area of concern addressed the current grade level taught and years of technology teaching experience of the respondent. The second area identified technical subject areas where the respondent felt more education and training was needed. The third area addressed International Technology Education Association (ITEA) *Standards of Technological Literacy*: Professional Development Standards.

The forth coming chapter will address what has been presented in the first four chapters such as history of teacher professional development, what teacher professional development consist of, and the research instrument used to obtain technology teacher professional development needs. It will address what conclusions can be drawn from the data obtained in the survey, and lastly the recommendations the researcher will make concerning professional development needs of Tidewater Virginia technology teachers and future studies of technology teacher professional development.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The problem of this study was to determine the perceived need for professional development of public school technology education teachers in Tidewater Virginia school systems. This chapter summarizes why and how the study was conducted, the conclusions that can be derived from the survey data, and recommendations for improving technology teacher professional development, and recommendations for future research.

SUMMARY

The focus of this study was to determine the professional development needs of Tidewater Virginia school system technology education teachers. The teachers were given a survey to determine their perceived types of professional development needed. Through the survey, the needs of the technology teachers can be determined. The teachers surveyed were middle and high school teachers from the Chesapeake, Virginia Beach, Norfolk, and Portsmouth School Systems.

In order for teachers to grow professionally, they must stay current. Professional development creates opportunities for teachers to gain new knowledge in their fields. The school systems should provide teachers with opportunities to gain such knowledge. School districts should seek input from the teachers when developing curriculum and professional development plans to improve the chance of a successful outcome.

A limitation of the study was that only technology teachers in the Tidewater Virginia school districts were surveyed. The survey was administered during the last

days of the school year so the research was conducted during a relatively short time period.

The instrument that was utilized for data collection was a survey. The survey contained questions about the years of teaching experience and grade level taught. The survey also sought teacher input on specific technology subject areas where more training and education would be beneficial. The last section of the survey dealt with professional development needs relating to teaching competence.

The survey was electronically sent to all of the technology teachers in the Tidewater Virginia school systems. Follow-up requests from the study participants were electronically sent two more times to ensure every technology teacher had a chance to participate. The survey's intent was to determine technology teacher professional development needs. Fifty-two or 36% of the technology teachers returned completed surveys. The data were analyzed and the results expressed as simple percentages.

CONCLUSIONS

The research goals of the study were as follow:

1. Determine the types of professional development being sought by Tidewater Public School Technology Education Teachers.

The technical survey areas where the highest percentage of teachers expressed a desire for additional education and training were as follows:

- 1) Animation Technology-58%
- 2) Digital Multimedia-42%
- 3) Optic and Laser Systems-38%

- 4) Web Page Design-38%
- 5) Digital Imaging-35%
- 6) Geo-spatial Technologies (GIS, GPS, etc.)-35%
- 7) Media and Video Technology-35%.

The professional development survey areas chosen by the highest percentage of respondents to improve teaching competence were as follow:

- 1) Develop learning activities that appeal to student interests and challenge students to reflect on practical experiences, was chosen by 71% of respondents.
 - 2) Coordinate instruction with curricula so that technological content is delivered effectively to maximize student learning, was chosen by 54% of respondents.
 - 3) Design and problem solving are presented as key activities and processes in the study of technology, was chosen by 42% of respondents.
 - 4) Design and evaluate curricula and programs across disciplines, was chosen by 40% of respondents.
 - 5) Develop abilities to use computers, audio-visual equipment, and mass media, as tools for enhancing and optimizing the learning environment, was chosen by 40% of respondents.
 - 6) Design and manage learning environments that operate with sufficient resources, was chosen by 40% of respondents.
2. Recommend specific types of professional development that should be made available to Tidewater Virginia technology education teachers.

The specific types of professional developments that should be made available to Tidewater Virginia technology teachers were as follow:

- 1) Technology teachers should take technology courses on a regular basis to keep current in their field of study.
- 2) Universities and professional organizations and companies should offer workshops in Animation Technology, Digital Multimedia, Optic and Laser Systems, Webpage Design, Digital Images, Geo-spatial Technologies, and Media and Video Technologies.
- 3) Universities should offer courses and workshops incorporating multiple student learning styles.
- 4) Universities offer workshops that address design and problem solving as key activities in the study of technology.
- 5) Local school systems should appoint and offer incentives to a lead teacher to become the point of contact between the school system and local universities with the responsibility of coordinating and planning teacher professional development.

RECOMMENDATIONS

The No Child Left Behind Act (NCLB) has raised standards academically and professionally. Across the country requirements for teacher qualifications and certification have been rising as a result of NCLB. Using the findings of this study it is possible to make several recommendations with regard to technology education teacher professional development.

First, the number of years exposed to the educational environment as a technology teacher. From the information gathered in this study, predictions can be made with regard to the likely number of years since the teacher attended college or university.

Over 40 percent of the teachers have been teaching for ten years or more and the technologies learned during their time at the university have undergone dramatic changes. Many of these teachers need updates to their technical knowledge base.

Second, universities should offer additional courses, or better publicize currently available courses, in Animation Technology, Digital Multimedia, Optic and Laser Systems, Webpage Design, Digital Images, Geo-spatial Technologies, and Media and Video Technologies. The Tidewater Virginia school districts should continue to encourage technology education teachers to take technology education courses on a regular basis to stay current or participate in professional development workshops.

Third, the survey areas dealing with professional development to improve teaching competence identified several areas of concern. Seventy-one percent of respondents, the highest percentage of the survey, chose, "Develop learning activities that appeal to student interest and challenge students to reflect on practical experiences," as an area where personal improvement was needed. The researcher recommends local universities to offer courses and workshops devoted to activity planning with special emphasis placed on incorporating multiple student learning styles in order to increase student interest and offer more challenging student projects. Fifty-four percent of respondents surveyed chose, "Coordinate instruction with curricula so that technological content is delivered effectively to maximize student learning," as an area where personal improvement was needed. This area of concern could easily be incorporated in the same local university workshops recommended previously. Forty-two percent of respondents chose, "Design and problem solving are presented as key activities and processes in the study of technology," as an area where personal improvement is needed. The researcher

recommends that technology teachers address this concern by remaining current with the changing roles of technology in society by taking related courses, attending related workshops, and regularly reading technology education journals.

Lastly, local school systems should appoint and offer incentives to a lead teacher at each school to encourage professional development. This teacher would be the point of contact between local universities and fellow teachers in the same school. The lead teacher along with designated district school system personnel would have input in the coordination and planning of school system teacher professional development and curriculum planning.

The information gained through this study should be used to improve technology teacher professional development. According to Loucks-Horsley, “Probably nothing within a school has more impact on students in terms of skill development, self-confidence, or classroom behavior than the personal and professional growth of their teachers....When teachers stop growing, so do their students” (Loucks-Horsley, 1998).

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APPENDICES

APPENDIX A- COVER LETTER

TIDEWATER VIRGINIA TECHNOLOGY EDUCATION PROFESIONAL DEVELOPMENT SURVEY

Dear Colleague:

Today's technology education professional is faced with a rapidly evolving learning environment. Educators must understand, apply, and assess this ever-changing environment in order to meet the educational needs of technology students. A key component of successful educators is strong and continuing professional development.

Your assistance is needed in assessing the current professional development needs of Tidewater Virginia technology teachers. This survey will be used to evaluate and make recommendations for providing professional development activities to enrich your teaching career.

This study is being undertaken by technology education department at Old Dominion University. The data collected will be used to plan professional development activities in you school system, at the university, and through the Virginia Department of Education.

Please complete the attached survey and return it electronically to Richard Nash at rnash002@odu.edu . The identity of respondents will be kept confidential and all reporting of findings or results will be done in such a way as to ensure confidentiality.

Thank you for your time and cooperation.

Sincerely,

John M. Ritz, DTE
Department Chair
Technology Education
Old Dominion University
Norfolk, VA

Richard Nash
Graduate Student
Technology Education, Old Dominion University, Norfolk, VA

APPENDIX B- FOLLOW-UP LETTER

Dear Colleague:

Your assistance is requested in assessing the professional development needs of Tidewater Virginia technology teachers. Please complete the attached survey and return it to me electronically at rnash002@odu.edu. This survey will be used to evaluate and make recommendations for providing professional development activities in your school system, at the university, and through the Virginia Department of Education. Your response is needed as soon as possible due to quickly approaching end of the current school year.

Thank you for your help.

Sincerely,

Richard Nash
Graduate Student
Technology Education
Old Dominion University
Norfolk, Virginia 23529

APPENDIX C- SURVEY DOCUMENT

Virginia Tidewater Technology Teacher Professional Development Survey

Purpose: the Technology Education faculty at Old Dominion University is conducting this study. The data collected will be used to plan professional development activities in the Tidewater Virginia public school system.

For Questions 1 and 2 please check your response in the boxes provided.

1. At what level do you currently teach?

- ☐ a.) Middle or Junior High School
☐ b.) High School

2. How many years have you been teaching Technology Education?

- ☐ a.) One year or less
☐ b.) Less than five years
☐ c.) Between five and ten years
☐ d.) More than ten and less than twenty years
☐ e.) More than twenty years

Please check those technological areas where you believe you need additional education and training.

- ☐ 3-D modeling
☐ Animation technology
☐ Automated systems and control technology
☐ Bioengineering
☐ Biotechnology
☐ Computer aided machines (CAM)
☐ Computer Integrated Manufacturing (CIM).
☐ Computer-aided drawing/design (CAD)
☐ Energy resources
☐ Digital images
☐ Digital multimedia
☐ Electronics
☐ Engineering design
☐ Geo-spatial Technologies (GIS, GPS, etc.)
☐ Graphic communications technology
☐ Graphic production
☐ Internet fundamentals
☐ Imaging technologies
☐ Manufacturing automated systems and technologies

APPENDIX C (cont'd)

- ☐ Media and Video Technology
- ☐ Microcomputer fundamentals
- ☐ Network Fundamentals
- ☐ Optic and laser systems
- ☐ Power and Transportation
- ☐ Robotic systems
- ☐ Technological Assessment
- ☐ Web Page Design

List other technologies where you would like to gain additional professional development. _____

Please check those areas where you believe you would like professional development to increase your competence in teaching.

3. Standards for Technological Literacy

- ☐ Understand the nature of technology (know the characteristics, scope, and core concepts of technology and understand how they permeate all technologies).
- ☐ Recognize the relationship between technology and society.
- ☐ Apply the attributes of design.
- ☐ Develop the abilities to use and maintain technological products and systems within a laboratory setting.
- ☐ Understand how the designed world uses resources, materials, machines, tools, people, information, energy, capital, and time in the development of products and systems.

4. Educational Perspectives on Students as Learners of Technology

- ☐ Recognize students similarities and differences, including cultures, interest, socio-economic backgrounds, and special needs.
- ☐ Provide cognitive, psychomotor, and affective learning opportunities (knowing plus doing equals understanding).

APPENDIX C (cont'd)

☐ Develop learning activities that appeal to student interests and challenge students to reflect on practical experiences.

☐ Conduct and use research on how students learn technology and how you can show that taking a technology education course really makes a difference in student's lives.

5. Design and Evaluate Technology Curricula and Programs

☐ Design and evaluate curricula and programs that enable all students to attain technological literacy.

☐ Design and evaluate curricula and programs across disciplines.

☐ Design and evaluate curricula across grade levels.

☐ Design and evaluate curricula and programs using multiple sources of information.

6. Use Instructional Strategies that Enhance Technology Teaching, Student Learning, and Student Assessment

☐ Coordinate instruction with curricula so that technological content is delivered effectively to maximize student learning.

☐ Develop abilities to use computers, audio-visual equipment, and mass media, as tools for enhancing and optimizing the learning environment.

☐ Utilize student assessment as a method for enhancing learning and modifying instruction.

7. Design and Manage Laboratory-Classrooms that Are Learner-Centered and Adaptable for Hands-On Experiences.

☐ Design and manage learning environments that operate with sufficient resources (Local community resources, donations from business and industry, and using recycled materials/equipment).

☐ Design and problem solving are presented as key activities and processes in the study of technology.

☐ Design and manage learning environments that accommodate student commonality and diversity.

APPENDIX C (cont'd)

- ☐ Design and manage learning environments that establish high expectations for technological learning.
- ☐ Design and manage learning environments that are safe, appropriately designed, and well maintained.
- ☐ Design and manage learning environments that are adaptable.

8. Prepared to Be Responsible for Continued Professional Growth.

- ☐ Assume commitment to self-assessment and responsibility for continuous professional growth, i.e., become Nationally Board Certified.
- ☐ Establish a personal commitment to ethical behavior within the educational environment.
- ☐ Develop abilities to effectively collaborate with peers and others in the school community.
- ☐ Participate in professional organizations related to technology education.
- ☐ Serve as an advisor for technology student organizations.
- ☐ Participate in school, community, and political efforts to create positive change in technology education programs.

Thank you for participating in this study. If you do not know, we have new technology/industrial technology facilities at old Dominion University. If you have the time, please stop by and visit with us (Education 228, 683-4305). If you would like to arrange a student group visit, arrangements can be easily made.

John Ritz