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The Attitudes of Core Subject Teachers Toward Making Technology Education a Required Subject

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THE ATTITUDES OF CORE SUBJECT TEACHERS TOWARD MAKING TECHNOLOGY EDUCATION A REQUIRED SUBJECT

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SIGNATURE PAGE

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INTRODUCTION

"We are a nation increasingly dependent upon technology" (ITEA, p. v). With this in mind, why are technology programs consistently relegated to the status of elective courses? Is technological literacy less compelling than literacy in the traditional core subjects? Certainly no educator would advocate removing any one of the recognized core subjects from a student's educational path. If we did, the student may not be fully capable of functioning in society. Why, then, do we neglect technology education when technology permeates virtually every aspect of the way we live, work, and learn?

Maybe it is time to give technology education an equal billing as compared to traditional core disciplines. Martin (2000) stated that technology education is a socially acceptable, but distinctly different discipline. Others declared that technological studies are an essential field of education (Dugger, 2001; Lauda, 1995). To establish the relevancy of technological studies, the International Technology Education Association proclaimed Technology Education as the primary discipline for the advancement of technological literacy.

A technologically diverse society needs to be educated about technology. To grow as a nation, today's students must grasp the technological skills required of tomorrow's workforce. By elevating technology education to the status of a required or core discipline, all students would have the opportunity to become technologically literate members of society.

STATEMENT OF THE PROBLEM

The problem of this study was to determine the attitudes of core subject teachers toward making Technology Education a required subject.

RESEARCH GOALS

The goals of this study were to:

1). Ascertain the definition and scope of Technology Education from the perspective of core subject teachers, and

2). Gather core subject teachers' opinions concerning the ability of Technology Education to reinforce learning in their content areas, then

3). Determine if Technology Education should be a core or required subject.

BACKGROUND AND SIGNIFICANCE

To include technology education as a required subject, support must be obtained from school boards, administrators, and most importantly, from teachers. Some believe that technology education is already a core discipline in our school systems (Albrecht, 2000), but others do not (Bensen, 1995; LaPorte, 2001). In 2000, the ITEA presented the Standards for Technological Literacy as guidance to Technology Education professionals. As part of the Technology for All Americans Project, these standards and benchmarks were established with the goal of promoting technological literacy.

While teachers in the technology education field are educated in the various technologies, teachers in other disciplines may not receive adequate training. A lack of training or understanding in an area may cause neutral to negative attitudes toward the subject. One of the goals of this study was to measure core teachers' understanding of the

scope of technology education. It is believed that if core teachers understand technology education, they will more readily accept it as a required course of instruction.

Unfortunately, studies and literature exist that indicate many teachers equate Technology Education with Educational Technology or Instructional Technology (Colaianne, 2000; Dugger and Naik, 2001). While the terms suggest similarities, they are actually quite different. It is believed that teachers who define Technology Education and Educational Technology similarly will not embrace Technology Education as a required subject.

Technology has permeated virtually every facet of our society. Students in this technological age can benefit from Technology Education. It can enhance, complement, and reinforce learning in areas such as mathematics, science, language arts, and social sciences. Teachers' opinions regarding this assumption will improve the understanding of where Technology Education stands in the overall system of education.

LIMITATIONS

This research was limited to core subject teachers at Princess Anne High School (PAHS) in Virginia Beach, Virginia. The PAHS teaching faculty consists of 173 teachers with 86 teachers in the core disciplines. Although elective course teachers and administrators could have contributed meaningful input, their opinions were outside the scope of this study.

ASSUMPTIONS

Teachers were certified in their academic discipline and have never taught in the technology education field. Teachers may have attended in-service type technology training. Teachers have been exposed to educational or instructional technology.

PROCEDURES

In order to conduct the research, an effective research instrument was developed, distributed, collected and analyzed. The instrument for this study was a questionnaire. The questionnaire gathered attitudinal information related to the three research goals. The questionnaire was distributed to core discipline teachers at Princess Anne High School with the concurrence of Old Dominion University. After the data were collected and statistically analyzed, the results were set forth.

DEFINITION OF TERMS

The following terms will guide the reader through this study:

1. Core subject - for the purpose of this study, a core subject will be in the disciplines of mathematics, science, language arts (English, literature, etc), and social studies.

2. Educational Technology (ET)- technology used within a classroom to enhance the delivery of course information. In this study, educational technology is synonymous with instructional technology.

3. Instructional Technology (IT)- see Educational Technology.

4. Technology Education (TE) - A study of technology including the processes and knowledge needed to solve problems and extend human capabilities (ITEA, 2000). ITEA's listed 20 technological literacy content standards under the following headings:

    a). The Nature of Technology

    b). Technology and Society

    c). Design

d). Abilities for a Technological World

e). The Designed World

5. NJROTC- Navy Junior Reserve Officer Training Corps is a program in secondary educational institutions with a mission of service to the United States, personal responsibility, and a sense of accomplishment.

OVERVIEW OF CHAPTERS

Chapter I introduces the reader to the need to include Technology Education as a required or core subject. The goals, significance, and procedures of the study are also outlined. Chapter II is a review of the literature related to this study. Chapter III describes the methods and procedures used to gather data. Chapter IV reports the findings of the study and Chapter V presents a summary of the research and presents recommendations for additional consideration.

CHAPTER II

REVIEW OF LITERATURE

The contents for this review of literature were in areas that supported the research goals of this study. The first goal, to ascertain the definition and scope of technology education, explored the numerous definitions of authors and organizations. The second goal was to explore technology education's impact upon the traditional core courses. The final area of interest concentrated upon the need to include technology education as a required course of instruction.

DEFINITION AND SCOPE OF TECHNOLOGY EDUCATION

The main goal of technology education is to educate children about technology (Hall, 2002; Zuga, 2000) and develop technological literacy (Daugherty, 2001; Dugger, 2001; Martin, 2000; Scott and Sarkees-Wircenski, 1996). Although each author's idea of technology education was worded differently, these two details were common. ITEA defined technology educations as "a study of technology, which provides an opportunity for students to learn about the processes and knowledge related to technology that are needed to solve problems and extend human capabilities" (p. 242). At first glance this definition may seem broad, but the pervasive nature of technology makes a narrower definition difficult.

The attitudes of core subject teachers toward technology education could be influenced by their perceived definition. Teachers' definitions of technology education were dependent upon their background and pre-service training (Bielefeldt, 1998) as well as in-service training provided by local school districts. Many professional educators

considered technology education and educational technology (also referred to as instructional technology) to be the same (Colaianne 2000; Dugger, 2001; McCade, 2001). Colaianne (2000) described educational technology as tools used to enhance teaching and learning. Examples of educational technology included video taping a drama class or using a computer to teach a math lesson. While students could learn about video recorders and computers in a technology education class, the mere act of using these devices to improve learning does not satisfy the definition of technology education.

The confusion between educational technology and technology education was not the only cause for misinterpreting the meaning of technology education. Others equated technology education to computers or computer-related subjects (Peterson, 1999; Starkweather, 2002). Many government publications including Educating Americans for the 21st Century (National Science Foundation, 1983), Technology in Schools (US Department of Education, 2002), and the No Child Left Behind (US Department of Education, 2001) initiative associated technology with computers.

Seasoned teachers may have also connected technology education with earlier courses in industrial arts (IA), vocational education (VE), or work placement (WP) programs. During the 1980's, many school districts started shifting from these programs to technology programs. Johnson (1989) categorized four problems within the IA and VE fields that hindered the conversion to technology education: resistance to change, lack of commitment, lack of resources, and general lack of understanding. These problems could also extend into the realm of core academics. While technology education may have evolved from IA, VE, and WP programs, they are not the same.

IMPACT UPON TRADITIONAL CORE COURSES

Most people realize that technology has changed the world, but few understand its scope (Scott and Sarkees-Wircenski, 1996). Although technology education is a separate discipline, its interdisciplinary nature makes it an effective complement to traditional core classes. Zuga's (2000) Technology Education as an Integrator of Science and Mathematics captured the essence of this idea in the essay title.

Although concepts learned in technology education can make learning in all fields more useful, fulfilling, and meaningful (Bensen, 1995), technology education seems to be a logical co-discipline of mathematics and science. Thematic projects such as Woodlands High School's Space Simulation, and the National Science Foundation's Integrated Mathematics, Science, and Technology (IMaST) Project and Phys-Ma-Tech Program have successfully increased enrollments, raised test scores, and created positive learning atmospheres (LaPorte and Sanders, 1995).

While mathematics and science are naturally compatible with technology education, other core disciplines can benefit from ties with technology. Sunai and Sunai (1997) recognized that the social implications of technology are immense. Since "technology can serve as both an instigator and a vehicle for social action" (p. 39), technology education programs helped develop social awareness and understanding. Technology education can also enhance reading and writing programs (Ilott and Ilott, 1997) and literature classes (Kleeberg and Kirkwood, 1997). With the assistance of trained technology professionals, teachers can include technology-based learning in virtually any subject to reinforce learning within their content area.

TECHNOLOGY EDUCATION AS A REQUIRED SUBJECT

A National Academy of Sciences panel concluded that graduating students needed "a mastery of core academic subjects that will teach them analytical and problem solving skills" (Useem, p. 32) required for success on the job and life in general. Making technology education a requirement for all students would significantly contribute toward this ideal.

The notion of establishing technology education as a core subject is not new. Technological literacy through technology education should begin in kindergarten and continue through high school (Dugger, 1996; Dugger, 2001; Martin, 2002; Pearson and Young, 2002; Starkweather, 1995). The World Council of Associations for Technology Education emphasized the precedence of technology education as a priority (Lauda, 1995). Others viewed technology education as a vital element of learning (Scott and Sarkees-Wircenski, 1996) that should be promoted as "an essential core subject in our nation's schools (Dugger, 1996, p. 15).

Starkweather (2002) pointed out that technology education has been historically subordinate to disciplines such as science and engineering even though its impact has been equally important. Some considered technology as merely "applied science" (Bybee, 2000, p. 23). While technology education may be currently described as a supportive subject, it is actually a socially acceptable, but distinctly different discipline (Martin, 2000).

In many countries, technology education is already considered part of the core curriculum (Dugger, 1995). Perhaps it is time to embrace technology education as a core discipline in our own country as well. Technology education not only builds technical

skills, it instills confidence and serves to increase technological literacy. The ability to function in society, make informed decisions, and solve problems is characteristic of a well-rounded education and in line with the definition of technology education.

SUMMARY

In our increasingly complex technological society, people will be required to understand increasingly complex technologies. Students who learn technology at an early age will clearly have an advantage. If technology education were a required subject for all students, from kindergarten to graduation, technological literacy would increase significantly. Before this happens, technology education must gain a significant following of supporters. While the attitudes of technology education teachers, administrators, guidance counselors, and students have been ascertained, the attitudes of teachers of core subjects have been neglected. This research project is needed to fill this void.

CHAPTER III

METHODS AND PROCEDURES

This chapter contains the methods and procedures that were used to conduct this descriptive study. As mentioned in Chapter II, the attitudes toward technology education have been surveyed from the perspective of administrators, guidance counselors, technology teachers, and students. This study sought to measure the attitudes of teachers who teach traditionally defined core courses. This chapter outlined the population of the study, the design of the instrument, data collection methods, and statistical analysis of these attitudes.

POPULATION

The population of this study was limited to teachers of core courses at Princess Anne High School (PAHS) in Virginia Beach, Virginia. While PAHS contains several specialized programs (International Baccalaureate, NJROTC, Special Education), the sample for this study was not stratified. The number of teaching faculty at PAHS is 173 of which 86 can be categorized as teachers of the core disciplines. The experience level of the teachers ranged from neophyte to experienced.

INSTRUMENT DESIGN

The instrument was designed to answer the research goals stated in this study. A Likert Scale was adopted as the measuring tool. Responses could range from "Strongly Disagree" to "Strongly Agree". Teachers were asked to respond to 15 questions pertaining to Technology Education. The 15 questions were divided into three sets of five questions to support the three research goals. The questions were randomly inserted into the questionnaire. For a sample of the questionnaire, see Appendix A.

The statements utilized to support the first research goal, to ascertain the definition and scope of Technology Education from the perspective of core subject teachers, attempted to capture the differentiation of Technology Education from educational technology and computers in general. One statement (Statement 4) was designed to compare the teacher's perceived definition of Technology Education with the basic concept of the ITEA definition. The statements used in this area include:

1). When asked to describe technology education, I mainly think of computers.

2). Educational technology and technology education are synonymous.

3). Technology Education's scope is limited to computer related subjects.

4). Technology Education teaches about technological processes and problem solving.

5). I use Technology Education in my core subject classroom.

The second research goal, to gather core subject teachers' opinions concerning the ability of Technology Education to reinforce learning in their content area, was supported by statements to gather opinions based upon a teacher's primary discipline, as well as the remaining core disciplines. The statements used in this area include:

1). Technology Education courses can significantly complement learning in the language arts.

2). Technology Education courses can significantly complement learning in the social studies.

3). Technology Education courses can significantly complement learning in the sciences.

4). Technology Education courses can significantly complement learning in the mathematics.

5). The use of technology has few benefits in my classroom.

The third research goal, to determine if Technology Education should be a core or required subject, sought to determine the core teacher's opinions as to the relevance or equality of Technology Education in relation to their primary discipline, as well as other core disciplines. Also included were statements regarding Technology Education as a requirement, elective, or non-requirement. The statements used in this area included:

1). Technological literacy is just as important as literacy in mathematics and science.

2). Technological literacy is just as important as literacy in the language arts and the social studies.

3). Technology Education should be a required subject for all students.

4). Technology Education is better suited as an elective course.

5). Technology related subjects are easily learned; therefore technology specific courses are not needed.

METHOD OF DATA COLLECTION

After the instrument design was established, a cover letter (Appendix B) and the survey questionnaire (Appendix A) were mailed to all core discipline teachers at Princess Anne High School (N= 86). A follow-up letter and another copy of the survey was mailed two weeks later to all non-respondents. The follow-up letter was included as Appendix C.

STATISTICAL ANALYSIS

The survey questionnaire was designed with closed ended statements and attitudinal measurements recorded utilizing a Likert scale to simplify data analysis. The statistical method utilized to describe the responses will include the central tendency measure of mean.

SUMMARY

This chapter outlined the methods and procedures used in this study. In order to determine the attitudes of traditional core discipline teachers toward making Technology Education a required subject, a survey needed to be developed, distributed, collected, and analyzed. Upon completion of the analysis, the findings were documented in Chapter IV.

CHAPTER IV

FINDINGS

The intention of this study was to ascertain the definition and scope of Technology Education from the perspective of core subject teachers, to gather core subject teachers' opinions concerning the ability of Technology Education to reinforce learning in their content areas, and to determine if Technology Education should be a core or required subject. Chapter IV is a presentation of the data obtained by surveying teachers in the traditionally defined core subjects.

RERORT OF FINDINGS

A cover letter and the questionnaire were mailed to the 86 core subject teachers at Princess Anne High School in Virginia Beach, Virginia on June 16, 2003. On July 7, 2003, a follow-up letter and questionnaire were mailed to teachers who had not responded to the initial mailing. Twenty-six (30%) completed questionnaires were returned from the initial mailing and an additional 12 (14%) were returned when prompted by the follow-up letter for a combined total of 38 (44%) completed questionnaires.

The surveyed population (n=86) consisted of an equal representation of the defined core subjects: mathematics (n=21), science (n=22), language arts (n=22), and social studies (n=21). The population of the participating respondents was somewhat skewed: mathematics (n=14), science (n=12), language arts (n=4), and social studies (n=8).

The data were calculated by computing responses for each of the 15 questions using the Likert Scale and deriving the algebraic mean based upon total number of

responses. The responses were given the following values: 1 – strongly disagree, 2 – disagree, 3 – neutral, 4 – agree, and 5 – strongly agree. The aggregate mean, as well as the mean for individual disciplines, was computed for further analysis.

RESEARCH GOAL #1

The first research goal, to ascertain the definition and scope of Technology Education from the perspective of core subject teachers, was measured using the responses to five statements. Statements 1 and 3 were formulated to test the notion that non-Technology teachers may closely associate Technology Education with computers or computer related activities. Overall, statement 1, "When asked to describe Technology Education, I mainly think of computers," produced a slightly less than neutral opinion (2.83). Social studies teachers were more likely to agree with the statement (3.7), while mathematics and science teachers tended to disagree with the statement (1.8 and 2.3 respectively). Statement 3, "Technology Education's scope is limited to computer related subjects" produced a mean of 1.83. The subgroups ranged from strongly disagree (science and social studies, 1.3) to disagree (mathematics, 1.5 and language arts 2.3).

Statement 2 was prepared to distinguish the difference between Technology Education and Educational Technology. As a whole, teachers tended to disagree with this statement (2.3). Language arts teachers were more neutral (2.7) than the other subgroups (mathematics, 1.8, science and social studies, 2.3).

As mentioned in Chapter III, Statement 4 was designed to compare the teacher's perceived definition of Technology Education with the basic concepts of the ITEA definition. The overall mean (4.16) indicated all subgroup agreed that Technology Education teaches about processes and problem solving. Mathematics and science

teachers strongly agreed (4.5 and 4.7, respectively) with the statement, while language arts and social studies teachers agreed (4.3 and 3.6). All subgroups agreed (3.75) that Technology Education was used in their core classroom (Statement 5). See Table 1.

TABLE 1
POPULATION MEANS FOR GOAL 1

	TOTAL	MATH	SCIENCE	SOCIAL STUDIES	LANGUAGE ARTS
When asked to describe Technology Education, I mainly think of computers	2.83 (neutral)	1.8	2.3	3.7	3.0
Educational Technology and Technology Education are synonymous	2.33 (disagree)	1.8	2.3	2.3	2.7
Technology Education's scope is limited to computer related subjects	1.83 (disagree)	1.5	1.3	1.3	2.3
Technology Education teaches about processes and problem solving	4.16 (agree)	4.5	4.7	3.7	4.3
I use Technology Education in my core subject classroom	3.75 (agree)	3.8	3.7	4.3	3.6

RESEARCH GOAL #2

The second research goal, to gather core subject teachers' opinions concerning the ability of Technology Education to reinforce learning in their content area, was supported by statements to gather opinions based upon a teacher's primary discipline, as well as the remaining core disciplines. Statements 6, 7, 8, and 9 were based upon the root sentence "Technology Education courses can significantly complement learning in..." with the core discipline titles inserted at the end.

Statement 6 queried the core teachers for their opinion on Technology Education in the language arts. The mean of all disciplines indicated agreement (4.00) that Technology Education could complement learning in the language arts. Mathematics and social studies teachers (4.2 and 4.3) demonstrated a slightly higher level of agreement than science and language arts teachers (3.5 and 3.7).

Statement 7 questioned the ability of Technology Education to complement learning in the social studies. Mathematics (4.2), science (4.3), and social studies (3.7) teachers agreed that Technology Education and the social studies were compatible. The language arts teachers (2.3) tended to disagree with their peers. Taken as a whole, core discipline teachers agree that Technology Education and the social studies are compatible (3.92).

Science disciplines and Technology Education were deemed to be highly complementary by core discipline teachers (4.66). Mathematics (4.6) and science (4.8) teachers strongly agree, while social studies (4.0) and language arts (4.3) teachers agree that Technology Education can complement learning in the sciences. The ninth statement sought core subject teachers' opinions toward the nature of compatibility between Technology Education and mathematics. A mean of 4.25 indicated that core subject teachers agreed with the statement. Individual disciplines included mathematics (4.2), science (4.0), social studies (4.0), and language arts (4.3).

Statement 10 served to balance the preceding statements and to determine the opinion of core discipline teachers toward the benefits of technology in their classroom. A mean of 1.75 indicated that core subject teachers disagreed with the statement "the use of technology has few benefits in my classroom". Mathematics (1.4) and language arts

(1.3) teachers were more inclined to disagree than science (2.3) and social studies (2.3) teachers. See Table 2.

TABLE 2
POPULATION MEANS FOR GOAL 2

	TOTAL	MATH	SCIENCE	SOCIAL STUDIES	LANGUAGE ARTS
Technology Education courses can significantly complement learning in the language arts	4.00 (agree)	4.2	3.5	4.3	3.7
Technology Education courses can significantly complement learning in the social studies	3.92 (agree)	3.6	4.3	3.7	2.3
Technology Education courses can significantly complement learning in the sciences	4.66 (strongly agree)	4.6	4.8	4.0	4.3
Technology Education courses can significantly complement learning in the mathematics	4.25 (agree)	4.2	4.0	4.0	4.3
The use of technology has few benefits in my classroom	1.75 (disagree)	1.4	2.3	2.3	1.3

RESEARCH GOAL #3

The third research goal, to determine if Technology Education should be a core or required subject, sought to determine the core teacher's opinions as to the relevance or equality of Technology Education in relation to their primary discipline, as well as other core disciplines. Also included were statements regarding Technology Education as a required course or as an elective. The core disciplines of mathematics and science were combined into one statement and the social sciences and the language arts were combined in another.

All course disciplines agreed (4.08) that technological literacy is just as important as literacy in mathematics and science. Mathematics (3.8) and language arts (3.7) teachers were to some extent less strongly agreeable with the statement but science (4.3) and social studies (4.3) teachers were somewhat more agreeable. Mathematics (4.2), social studies (4.3) and language arts (3.7) teachers agreed that technological literacy is just as important as literacy in the language arts and the social studies. All (n=12) of the science (5.0) teachers strongly agreed that literacy in the social sciences, language arts, and the technologies are equally important.

The survey respondents agreed that Technology Education should be a required subject (4.08) for all students (Statement 13). Mathematics (4.0), science (4.3), social studies (4.0), and language arts (3.7) teachers were in relatively close agreement with the statement. Additionally, core subject teachers did not agree (2.33) that Technology Education courses should be in elective status (statement 14), although mathematics (2.6) and social studies (2.7) teachers were more neutral than science (2.0) and language arts (1.7) teachers. The final statement, "technology related subjects are easily learned; therefore technology specific courses are not needed," was disagreed upon by social studies (2.0), language arts (2.0), and science (1.8) teachers and more strongly disagreed with by mathematics teachers (1.4). The combined mean for this statement was 1.67. See Table 3.

SUMMARY

The purpose of this study was to determine the attitudes of core subject teachers toward making Technology Education a required subject. The study consisted of three research goals:

TABLE 3
POPULATION MEANS FOR GOAL 3

	TOTAL	MATH	SCIENCE	SOCIAL STUDIES	LANGUAGE ARTS
Technological literacy is just as important as literacy in mathematics and science	4.08 (agree)	3.8	4.3	4.3	3.7
Technological literacy is just as important as literacy in the language arts and the social studies	4.50 (strongly agree)	4.2	5.0	4.3	3.7
Technology Education should be a required subject for all students	4.08 (agree)	4.0	4.3	4.0	3.7
Technology Education is better suited as an elective course	2.33 (disagree)	2.6	2.0	2.7	1.7
Technology related subjects are easily learned; therefore technology specific courses are not needed	1.67 (disagree)	1.4	1.8	2.0	2.0

1). To ascertain the definition and scope of Technology Education from the perspective of core subject teachers, and

2). Gather core subject teachers' opinions concerning the ability of Technology Education to reinforce learning in their content areas, then

3). Determine if Technology Education should be a core or required subject.

Questionnaires and a follow-up letters were mailed to 86 teachers in the traditionally defined core subjects of mathematics, science, the social studies, and the language arts. The findings from the thirty-eight responses were tabulated in this chapter and will be presented in the summary, conclusions and recommendations chapter of this study.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The problem of this study was to determine the attitudes of core subject teachers toward making Technology Education a required subject. Chapter V is the presentation of a summary, conclusions, and recommendations. In this chapter, data will be interpreted and conclusions and recommendations will be made based upon these interpretations.

SUMMARY

Ours is a technologically advanced society. An understanding of technological principles and processes are essential to function within it. Basic technological literacy is not a nicety; it is a necessity. In order to ensure technological literacy, educationalists must embrace and utilize all available means to expose students to the various technologies and their processes.

Scholarly opinions differ as to whether Technology Education is already a core discipline in our school systems. Many educators oppose the belief that Technology Education should be elevated to the status of a core subject. Inadequate training, an inaccurately defined scope, or misunderstandings of cross discipline relevance toward Technology Education are but a few of the factors responsible for this perception. These viewpoints aside, legislators, administrators, and perhaps most importantly, teachers must agree to accept the inclusion of Technology Education as a core subject in order to ensure widespread technological literacy among our students.

This study sought to measure the attitudes of teachers who teach traditionally defined core courses toward making Technology Education a required subject. The goals of this study were to 1) ascertain the definition and scope of Technology Education from

the perspective of core subject teachers, 2) to gather core subject teachers' opinions concerning the ability of Technology Education to reinforce learning in their content areas, and then 3) to determine if Technology Education should be a core or required subject. The study was limited to teachers of core courses at Princess Anne High School (PAHS) in Virginia Beach, Virginia. The number of teaching faculty at PAHS is 173 of which 86 can be categorized as teachers of the core disciplines.

The survey instrument was designed in the form of a questionnaire. A Likert Scale was adopted as the measuring tool. Responses could range from "Strongly Disagree" to "Strongly Agree". Teachers were asked to respond to 15 questions pertaining to Technology Education. The 15 questions were divided into three sets of five questions to support the three research goals. A total of thirty-eight (44%) complete questionnaires were returned and tabulated. The statistical method utilized to describe the responses was the central tendency measure of mean.

CONCLUSIONS

Based upon the findings of this study, the conclusions for the three research goals are thereby submitted.

RESEARCH GOAL #1: To ascertain the definition and scope of Technology Education from the perspective of core subject teachers. The statements used in this area include:

1). When asked to describe technology education, I mainly think of computers.

2). Educational technology and technology education are synonymous.

3). Technology Education's scope is limited to computer related subjects.

4). Technology Education teaches about technological processes and problem

solving.

5). I use Technology Education in my core subject classroom

The responses to these statements indicated that PAHS core subject teachers' understanding of the definition and scope of Technology Education was discipline dependant. Mathematics and science teachers disagreed that Technology Education is mainly associated with (mean = 1.8 and 2.3, respectively) or limited to computers and related subjects (1.5 and 1.3). Social studies teachers mainly associated computers with Technology Education (3.7) but disagreed (1.3) that the scope was limited to computers. Language arts teachers were neutral (3.0) in their association of computers and Technology Education but disagreed (2.3) that the scope was limited to computers.

All disciplines agree (4.16) with the basic ideals of the International Technology Education Association's (ITEA) benchmark technology standards and proclaimed to use technology in their classroom (3.75). All disciplines except language arts disagree (mathematics, 1.8; science, 2.3; social studies, 2.3; language arts, 2.7) that Educational Technology and Technology Education are synonymous.

Based upon these results, PAHS mathematics and science teachers seem to have an understanding of the definition and scope of Technology Education. While social studies and language arts teachers understand the definition and scope, their perception was not as discerning as their peers as indicated by their stronger association of Technology Education with computers.

RESEARCH GOAL #2: To gather core subject teachers' opinions concerning the ability of Technology Education to reinforce learning in their content area. The statements used in this area include:

1). Technology Education courses can significantly complement learning in the language arts.

2). Technology Education courses can significantly complement learning in the social studies.

3). Technology Education courses can significantly complement learning in the sciences.

4). Technology Education courses can significantly complement learning in the mathematics.

5). The use of technology has few benefits in my classroom.

All disciplines agreed or strongly agreed that Technology Education could significantly complement learning in each core discipline. The aggregate mean for each discipline includes: language arts, 4.00; social studies, 3.92; science, 4.66; mathematics, 4.25. These results are noteworthy and indicate that teachers value how Technology Education can support the teaching of their subjects.

A review of the means from an individualized discipline perspective holds two points of interest. First, language arts teachers disagree that Technology Education courses can significantly complement learning in the social studies (2.3), although social studies teachers agree (3.7) with the point of view. The converse position is not true. Social studies (4.3) and language arts (3.7) teachers agree Technology Education courses complement learning in the language arts. Secondly, science and mathematics teachers strongly agree (4.8 and 4.6, respectively) Technology Education complements learning in the sciences. Both agree Technology Education complements learning in mathematics (science, 4.0 and mathematics, 4.2).

PAHS core discipline teachers generally agree (above exception noted) that concepts learned in Technology Education can enhance learning in all fields. This opinion supported the view put forth by Bensen (1995). The data also indicated slightly stronger opinion regarding the complementary nature between Technology Education and mathematics or science.

RESEARCH GOAL #3: To determine if Technology Education should be a core or required subject. The statements used in this area included:

1). Technological literacy is just as important as literacy in mathematics and science.

2). Technological literacy is just as important as literacy in the language arts and the social studies.

3). Technology Education should be a required subject for all students.

4). Technology Education is better suited as an elective course.

5). Technology related subjects are easily learned; therefore technology specific courses are not needed.

The core subject teachers at PAHS were in agreement concerning the importance of technological literacy and literacy in the traditional core disciplines. A mean of 4.08 indicated core discipline teachers agreed technological literacy was just as important as literacy in mathematics and science. Although the mean for the equality in literacy between Technology Education, language arts, and social studies was relatively high (4.50), a closer look at the individual discipline means explained why. All science teachers (n=12) strongly agreed (5.0) to give literacy in technology, language arts, and

social studies equal billing. Science teachers, to a lesser extent, agreed (4.3) that technological literacy and literacy in mathematics and science were equally important.

The remaining three statements captured the opinion of core discipline teachers toward making Technology Education a core subject. All disciplines agreed (4.08) Technology Education should be required for all subjects. Science and language arts teachers disagreed (2.0 and 1.7) with the statement "Technology Education is better suited as an elective course". Mathematics and language arts teachers were more neutral in their opinion (2.6 and 2.7). All disciplines disagreed (1.67) that "technology related subjects are easily learned; therefore technology specific courses are not needed".

RECOMMENDATIONS

The data reported in this study indicated general support from the community of core subject teachers toward making Technology Education a required subject. Based upon the findings, the following recommendations are submitted:

1. The range of this study needs to be expanded to encompass a greater selection of participants. This study gathered opinions of the core subject teachers within a single school, therefore it is lacking in depth. Similar opinions from other schools in the nation would validate the findings and provide support for increasing the technological awareness of our students.

2. Since core subject teachers agree Technology Education should be required, other groups should be queried. Teachers of elective courses, local administrators, parents, and students should be surveyed. Similar results could garner further support in establishing the need for technological literacy in our schools.

3. Technology Education funding should be increased to accommodate the student load if technology courses become required. In the absence of state or local funding for additional technology laboratories, partnerships with local technological firms should be developed to give "real life" relevance to technology.

4. Core subject teachers and technology teachers should develop teaching strategies to maximize learning in all areas. An interdisciplinary approach to learning could prove the complementary nature of Technology Education and the core subjects as opined by the participants of this study.

5. Public relations campaigns should be established to reflect the opinions of academic teachers for the need for the study of Technology Education in our nation's schools.

6. School administrators and board members need to be informed that academic teachers value the contribution of Technology Education to support the teaching of their subject area.

7. Further study is needed to investigate whether students who completed Technology Education courses scored well on academic standardized tests.

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APPENDICES

APPENDIX A

Survey Questionnaire

Technology Education Survey Form

Purpose: To determine the views and opinions of traditionally defined core subject teachers' toward Technology Education.

Name:_____ (optional)

1). What primary subject do you teach? (circle)

a) Language Arts
b) Social Studies
c) Mathematics
d) Science

2). Years of experience as a teacher: (circle)

a) 1-4 b) 5-9 c) 10-14 d) 15-19 e) 20+

(Place an "X" in the appropriate box next to each item.) 1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree (Comments are welcome, explain in remarks)	1	2	3	4	5
1. Technology Education courses can significantly complement learning in the language arts.					
2. Technology Education teaches about processes and problem solving.					
3. Technology Education courses can significantly complement learning in the sciences.					
4. Technological literacy is just as important as literacy in the language arts and the social studies.					
5. Technology Education courses can significantly complement learning in the mathematics.					
6. Technology Education is better suited as an elective course.					
7. The use of technology has few benefits in my classroom.					
8. Technology related subjects are easily learned; therefore technology specific courses are not needed.					
9. I use Technology Education in my core subject classroom.					
(over)					

1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree (Comments are welcome, explain in remarks)	1	2	3	4	5
10. Technology Education courses can significantly complement learning in the social studies.					
11. Educational technology and technology education are synonymous.					
12. Technology Education should be a required subject for all students.					
13. When asked to describe technology education, I mainly think of computers.					
14. Technological literacy is just as important as literacy in mathematics and science					
15. Technology Education's scope is limited to computer related subjects.					

Comments or amplifying information.

APPENDIX B

Cover Letter

Michael C. Hamby
4743 Rosecroft St.
Virginia Beach, VA 23464
Phone: 495-5612

Dear Teacher,

The purpose of this letter is to ask for your valuable assistance in determining the opinions of Technology Education from the perspective of a teacher of a core subject. During my research, I noticed that administrators, guidance counselors, technology education teachers, and students had already been surveyed. I was astonished to learn that core subject teachers, the backbone of our educational system, had been overlooked. I hope to remedy this oversight with my study.

Your assistance in this study will be greatly appreciated. To participate, please take a few minutes, at your convenience, to answer the attached questionnaire. You may return the completed questionnaire in the enclosed stamped, self-addressed envelope. Although you are under no obligation to participate, your knowledge is vital to this study. All information, including names, will remain strictly confidential.

This project is also one of my graduate degree requirements at Old Dominion University. I hope to graduate this fall after my student teaching assignment (wish me luck!). Thank you in advance for your assistance.

Respectfully,

Michael C. Hamby

APPENDIX C

Follow-up Letter Cover Page

Michael C. Hamby
4743 Rosecroft St.
Virginia Beach, VA 23464
Phone: 495-5612

Dear Teacher,

The purpose of this letter is to ask for your valuable assistance in determining the opinions of Technology Education from the perspective of a teacher of a core subject. I am sure that you have been busy tending to the myriad details required for the completion of a successful academic year. Perhaps my original request for assistance was overlooked as you graded papers, prepared report cards, and tended to administrative tasks. I can assure you, I know the feeling. But now that classes are over, I appeal to you for the aforementioned assistance.

During my research, I noticed that administrators, guidance counselors, technology education teachers, and students had already been surveyed. I was astonished to learn that core subject teachers, the backbone of our educational system, had been overlooked. I hope to remedy this oversight with my study.

Your assistance in this study will be greatly appreciated. To participate, please take a few minutes, at your convenience, to answer the attached questionnaire. You may return the completed questionnaire in the enclosed stamped, self-addressed envelope. Although you are under no obligation to participate, your knowledge is vital to this study. All information, including names, will remain strictly confidential.

This project is also one of my graduate degree requirements at Old Dominion University. I hope to graduate this fall after my student teaching assignment (wish me luck!). Thank you in advance for your assistance and enjoy the remainder of your summer.

Respectfully,

Michael C. Hamby