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### A Study to Determine the Impact of Instructional Technology on Hampton Roads Area Teachers in the Development of Classroom Instruction

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A STUDY TO DETERMINE THE  
IMPACT OF INSTRUCTIONAL TECHNOLOGY  
ON HAMPTON ROADS AREA TEACHERS IN THE  
DEVELOPMENT OF CLASSROOM INSTRUCTION

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

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

By  
George M. Everett, Jr.

December 1993

APPROVAL PAGE

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

APPROVAL BY: John M. Ritz  
Dr. John M. Ritz  
Advisor and Graduate  
Program director

12-20-93  
Date

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## CHAPTER I

### INTRODUCTION

Educators have an obligation to provide the best instruction available to their students. Recent advances in instructional technology have made it easier to use in curriculum development, course planning and instruction. Many educational institutions have initiated programs to provide better instructional technology training for future teachers.

The current presidential administration is firmly behind the development of an advanced National Information Infrastructure (NII). Educators trained to interact with this technology could benefit greatly.

According to *The National Information Infrastructure: An Agenda for Action*, a national information super highway would provide "a seamless web of communications networks, computers, databases, and consumer electronics that will put vast amounts of information at users' fingertips" (Government Report, 1993).

Educators need to train students in how to access and use information. Therefore, educators need specialized training in how to access and apply the information themselves. Otherwise, our educational system runs the risk of graduating technological illiterates who are unable to function effectively in society.

Until recently, many education professionals have been reluctant to implement instructional technology in the classroom. The future of our educational system depends on the ability of



educators to adapt and implement the technological advancements our world demands.

### Statement of the Problem

The problem of this study was to determine the impact of instructional technology on Hampton Roads area teachers in the development of classroom instruction.

### Research Goals

The three specific research goals implied by the statement of the problem were to answer the following questions.

1. Do teachers currently use instructional technology in the classroom?
2. Do teachers consider using available instructional technology during course and lesson planning?
3. Do teachers feel confident enough to use instructional technology in the classroom?

### Background and Significance

Technology has the potential to revolutionize the classroom. However, many teachers are uncomfortable with technology when

they are not allowed to control the practice of their craft.

Instructional technology is perceived by some teachers as a threat to overtake the classroom.

In an article published in 1984, Robert Heinich discussed the evolution of instructional technology in the classroom. He concluded that the implementation of instructional technology has been slowed by a history of training teachers within the limitations of existing educational systems. (Heinich, 1984, p. 67-87). One year later he argued that there are forces within educational institutions that perpetuate the craft nature of teaching at the expense of instructional technology training (Heinich, 1985, p. 9-15). He suggested further research into the elements that hinder the training of instructional technology and to devise strategies for implementing a more widespread application of instructional technology.

Many of today's teachers were taught by the chalkboard and carry on that tradition. Students, however, are growing up in a society of computer games and music videos. Many have computers in their homes. How is a teacher able to compete for attention and the completion of learning objectives? By learning how to better use instructional technology for the classroom.

Some teachers are interested in learning to apply instructional technology. Many attend in-service training to become better acquainted with the developments. In the Hampton Roads area of Virginia, the Consortium for Interactive Instruction provides several seminars and workshops each year to provide educators training in instructional technology. But do teachers feel confident

enough in their ability to use instructional technology in course planning and classroom instruction?

### Limitations

This study was limited to the school systems in the geographical area of Hampton Roads, Virginia, that participated in the Consortium for Interactive Instructions' fall conference, 1993. The individual budget of each school system is a limiting factor. The directives of the various school boards and administrators poses additional limitations. And the willingness of each teacher to participate in the instructional technology training currently being offered is also a factor that may limit this study. This study focuses specifically on educators in Hampton Roads, Virginia.

### Assumptions

The basic assumptions of this study are as follows:

1. Survey respondents will honestly answer the survey questions.
2. Survey respondents are educators in Hampton Roads, Virginia.
3. Survey respondents are educators from K-12.

## Procedures

A survey instrument was developed and one hundred were distributed during several seminars at the Consortium for Interactive Instruction's fall 1993 conference. Those were collected on site. The instrument used a Likert rating scale to gather responses to specific questions. The survey was tabulated by determining the mean response for each question.

## Definition of Terms

The realm of instructional technology is rapidly changing. There are many terms that are new. Hereafter, instructional technology may be referred to as "IT" or simply as "technology". The following is a list of terms that may need further explanation.

Instructional Technology Videos, computers, laser discs, CD-ROM and other multi-media technology.

CD-ROM Stands for compact disc-read only memory. Much of the new educational software is in this format. Discs are inserted into a CD video player. Allows the user to see and hear displays on a monitor.

Software Materials such as discs, tapes, etc., that contain information.

Hardware Computer, compact disc player or other instructional technology machinery that has mechanical components.

## Summary

The first chapter of this study dealt with the determination that further research in the area of instructional technology and its use by teachers in the classroom is necessary. This researcher has provided research goals, background and significance, limitations, and assumptions.

The following chapters of this study include a review of pertinent literature (Chapter II), the methods and procedures used in this study (Chapter III), the findings of the data collected (Chapter IV), and conclusions and recommendations (Chapter V).

## CHAPTER II

### REVIEW OF LITERATURE

The Review of Literature provides an overview of research which helps to define the impact of instructional technology on educators. The material contained in this chapter includes previous research which express various thoughts of experts on instructional technology. In addition to findings in this field, proposals were studied that dealt with educational leadership in terms of implementing instructional technology. This was necessary in order to discuss the apparent correlation between the educational goals of the presidential administration and educator involvement in using instructional technology. This chapter is organized to reflect the research goals in chapter I. It includes sections on (1) Challenge for Action and Reform, (2) Improving Instructional Technology Skills, and (3) Implementation of Instructional Technology.

#### Challenge for Action and Reform

Advances in technology are occurring rapidly. Phone companies, cable firms, and other private industries are investing millions in communication technology. But until recently, the executive branch of the United States had little to say about the information age and the role of education.

In the spring of this year, the presidential administration released a report titled The National Information Infrastructure:

Agenda For Action (1993). This report, which is available via electronic mail, states that

all Americans have a stake in the construction of an advanced National Information Infrastructure (NII), a seamless web of communications networks, computers, databases, and consumer electronics that will put vast amounts of information at users' fingertips. Development of the NII can help unleash an information revolution that will change forever the way people live, work, and interact with each other (Government Report, 1993, p. 1).

Such a profound statement generated by the presidential administration should not go unnoticed by those in charge of educating our youth. The report goes further by stating that " The best schools, teachers, and courses would be available to all students, without regard to geography, distance, resources, or disability" (Government Report, 1993, p. 1). As an example, an electronic bulletin board system was developed that linked Montana's 114 one room schools to each other and Western Montana College. By 1993, the Big Sky Telegraph system linked hospitals, libraries, women's centers, and county extension services (Government Report, 1993 p. 22).

The previous example clearly implies the potential for users of technology. Improved communication and quick access to information will revolutionize the way we live for the rest of our lives.

The NII proposal also addresses the issue of "lifelong learning". It calls for Americans to be thoroughly trained and educated in order to compete for well paying jobs. According to the NII, "90 million

adults in the United States do not have the literacy skills they need to function in our increasingly complex society". (Government Report, 1993, p. 15)

How will the educational system handle the challenge for training in technology? One expert proposes a reform in education in order to accomplish the task.

Ernest Boyer, the president of The Carnegie Foundation for the Advancement of Teaching, located in Washington D.C., recently described a five-point plan for education reform. One of the points was Technology as Teacher. He asserts that public schools have been largely bypassed by the revolution occurring in private industry regarding video and computer technology.

If we could blend electronic images with great teachers and books, and use computers as learning tools, America could, in the next century, have the most outstanding education system in the world (Boyer, 1992, p. 66).

Some reform in education may be necessary in order to meet the challenge for action. However, this will require an upgrading of technology skills by educators.

### Improving Teacher Technology Skills

The integration of teacher technology skills is an important step in improving our educational system. It has been established that a systematic program for teacher technology training provides positive results.



In a study for Nova University, Elizabeth Brennan describes a program designed to increase elementary teachers comfort and skill in the use of computer related technology for the purpose of establishing effective integration of instructional technology into the classroom. Other stated ancillary goals included improved instructional effectiveness in the classroom through the development of an alternative mode of computer applications and an increase of interactive rather than passive modes of instruction. Implementation processes included strategic, long range planning, and comprehensive training and staff development. Six formal workshops were then offered to teachers to provide theoretical information on the integration of computers and related technology in the classroom as well as information on practical applications. Additionally, three workshops were given in order to practice, simulate, and apply newly acquired concepts and skills. Data collected before and after implementation of the program revealed:

1. Increased involvement in integrating computer assisted instruction into the classroom.
2. An increase in student exposure to computer assisted instruction experiences.
3. A decrease in teacher fear of technology.
4. Increased effective utilization of computers by training participants.

Brennan further recommended that systematic teacher training with measurable results continue to be offered at regular intervals (Brennan, 1993).

Although Brennan's study suggests a workshop approach, Richard Overbraugh, professor of instructional technology of Old Dominion University, suggests a singular strategy. He proposes that teachers concentrate on one piece of hardware first. Knowing one machine "in depth" allows the user to develop confidence. Overbraugh also states that teachers "need to start by using the computer in a personally meaningful way" (lecture, 1993). He recommends teachers learn word processors, grade book programs, test generators, data bases, spreadsheets, and presentation software. Overbraugh discussed how Old Dominion University has stepped up course offerings to pre-service and in-service teachers. At least six new courses in IT will be offered by the fall of 1994.

Universities are not exclusive in providing teacher technology training in Hampton Roads, Virginia. The Consortium for Interactive Instruction (CII), is a conglomerate of area school systems united for the purpose of providing interactive instructional training and services to teachers and administrators. The CII is managed by WHRO, the local Public Broadcasting Network affiliate.

CII offers several professional development opportunities for educators. The Tech Trek Summer Technology Camp is a two week intensive series of technology orientated workshops originally designed for math and science teachers, but now includes other subjects selected for emphasis. In 1994, the Newport News school system plans to send forty-five teachers to the Tech Trek workshops. The annual Technology in Education Conference generally attracts over one thousand teachers, library media specialists and administrators to take part in seminars and hands-on workshops.

CII offers several other services. For students, The Great Computer Challenge is presented yearly as a way for students to compete in categories such as desktop publishing, art, and music. Group purchases of software and related items allow the school systems to receive discounts. There are also opportunities to network and gather information via Interactive Dimensions, a newsletter published by CII (Callahan, personal interview, 1993).

### Implementing Instructional Technology

Recent research has shown that the distribution of technology has improved dramatically in schools. A study by Henry Jay Becker indicates that in 1988 there was on average one computer for every 30 students in public schools. This ratio had improved to one computer for every 16 students by 1992 (Becker, 1993). Computers are reaching the schools. But how long does it take for teachers to use them effectively?

In studies conducted by the Center for Children and Technology (CCT), six hundred teachers using IT reported that it took five or six years of sustained tinkering and effort to achieve their competency with technology (Sheingold & Hadley, 1991). Personal enthusiasm, having planning time for training and practice, a school structure and climate that was supportive and individual effort were cited as key factors for successful implementation of IT.

Other researchers suggest even more attention and support is needed in order to implement technology into the classroom. Jan

Hawkins and Katie MacMillan of the Center for Children and Technology call for more in-service training and study of IT.

Professional development to use technology to reform the learning environment has never kept pace with the purchase and distribution of equipment. Attention needs to shift to a new kind of sustained support for teaching professionals—support that combines learning about technology with how new teaching practices can realize new learning conditions. This area demands inquiry in the decade ahead (Hawkins, MacMillan, 1993, p. 26).

In order to implement successfully, instructional technology needs more than attention. It needs commitment from administrators. In *Technology Express*, a monthly television program produced by Fairfax County Schools of Virginia, and broadcast over the Virginia Satellite Education Network (VSEN), several points were made by administrators concerning teacher job security, commitment and the new technology available to assist in developing and providing instruction. It included:

1. Technology doesn't replace the teacher.
2. Technology enhances education.
3. Keyboarding skills are as essential today as cursive writing was thirty years ago.
4. Educational software should be used to reinforce what students learn in the classroom.
5. Computerized instruction lets students and teachers progress at their own pace.

The program further suggested that teachers have to become learners in order to apply the new technology available to them. Once hardware is purchased, software makes keeping up with changes easier. And after teachers develop confidence using technology, students will move toward more self-directed learning and problem solving with the teacher as facilitator.

In the past, technology training was considered expensive to implement. However, with the steep drop in the price of computers and other hardware, teachers should have improved access to technology.

The NII report states "studies have shown that computer-based instruction is cost-effective, enabling 30% more learning in 40% less time at 30% less cost" (Government Report, p. 15). Lower costs should give school systems the impetus for greater implementation of IT.

### Summary

The review of literature has presented an overview of material associated with the research goals of this study. The federal government has issued an agenda for action with emphasis on developing technology. Studies have called for change and reform regarding educators using instructional technology. Recent studies predict that an average of five to six years are needed to learn IT once an educator begins training. In an attempt to meet the instructional training needs of educators, a group of Hampton Roads area school systems known as the Consortium for Interactive

Instruction is offering several programs and services. Old Dominion University has also attempted to address the instructional technology training issue by offering new courses to pre-service and in-service teachers. According to reports, teachers will have to become learners in order to integrate the new instructional technology into the classroom. And with lower costs, the climate has improved for the implementation of instructional technology.

Chapter III will outline the Methods and Procedures used by the researcher. It will include Methods and Procedures, Population, Instrument Design, Data Collection Procedures, and Statistical Analysis.

## CHAPTER III

### METHODS AND PROCEDURES

The purpose of this chapter is to explain the procedures used to design and administer the survey instruments used in this study. Topics addressed in Chapter III are population, instrument design, data collection procedures and statistical analysis.

#### POPULATION

The subjects of this study were Hampton Roads, Virginia, area educators attending the Consortium for Interactive Instruction (CII) fall conference. Bethel High School, Hampton, Virginia served as the site for the study. Of the approximately seven-hundred and fifty K-12 educators in attendance, one-hundred teachers and Library Media Specialists were chosen at random to participate in this study. The level of knowledge of these educators regarding instructional technology varied from novice to considerably experienced in IT. From observation, it was determined most of the participants were female and from a wide variety of ethnic backgrounds.

#### INSTRUMENT DESIGN

The instrument was designed based on interviews with experts and developed in regard to the goals of this research. The

instrument was an inventory set up on a Likert response scale, using a highly favorable rating of five (5) and a least favorable response of (1), to questions that specifically relate to the research goals. The instrument design did not provide a comment area. The instrument was one page in length. The instrument design length was deliberate on the part of the researcher to facilitate completion and return during the conference (see Appendix B).

### DATA COLLECTION PROCEDURES

After making prior arrangements with the director of CII, initial contact with the respondents was made in person at the CII fall conference. The survey was distributed by hand to teachers who were attending seminars at the conference. An explanation was given in a cover letter (see Appendix A) as to the purpose of the survey and they were asked to fill out and return the survey immediately. After the surveys were returned, the researcher assembled the data collected.

### STATISTICAL ANALYSIS

Eighty-two out of one-hundred surveys were round for an eighty-two percent return rate. The responses for each question were noted on a Likert scale with a high score of (5) to a low of (1). Responses were then arranged into a frequency distribution from which a mean average score was determined for each question.



Questions posed focused on the three research goals stated in Chapter I.

### SUMMARY

This chapter has dealt with the methods and procedures used to conduct this study. Selection of the sample population were outlined. Instrument design was covered. Finally, data collection and statistical analysis were discussed. In Chapter IV, the researcher will report the findings of this study.

## CHAPTER IV

### FINDINGS

The problem of this study was to determine the impact of instructional technology on the development of classroom instruction by teachers in Hampton Roads. This chapter contains the results of data collected from the survey instrument. The data was used to determine if teachers are currently using instructional technology, if they are using instructional technology in planning and developing classroom instruction, and if they feel confident using instructional technology in the preparation and delivery of classroom instruction.

### SURVEY RESPONSE

Eighty-two out of one-hundred surveys were returned which resulted in an 82 percent return rate. The subjects were asked to respond to each question according to a value scale of 1-5 with 1 assigned a low or least favorable rating and 5 assigned a high or most favorable rating. The responses were then calculated to determine the mean rating for each response.

### DATA ANALYSIS

Following is a report on each question administered through the survey. Data from the questions is reported in Table 1.

The first question on the survey instrument, "Do you use instructional technology?", had a mean of 4.2 based on 82 responses. This indicates a favorable response.

The second question, "Do you have access to instructional technology for your particular course?", had a mean of 3.7. This indicates a favorable response.

Question three "Should teachers have more input in the selection of instructional technology for their classroom"?, established a mean of 4.9. This indicates a highly favorable response.

The fourth question, "Has your school system informed you of available instructional technology for your course?", had a mean rating of 3.5. This indicates a favorable response.

Question five, "Are you considering instructional technology materials during course planning?", had a mean of 4.2. This indicates a favorable response.

The sixth question, "When selecting a topic for instruction do you seek instructional technology to reinforce content?", had a mean rating of 3.8. This indicates a favorable response.

Question number seven asked "Has your in-service training been effective?" and received a mean rating of 3.1. This indicates a neutral response.

Question number eight, "Do you feel the use of instructional technology helps students learn subject matter?", received a rating of 4.8. This indicates a highly favorable response.

"Does your school system provide regular in-service in using instructional technology?" was the ninth question and rated a mean of 3.0. This indicates a neutral response.

The final question, " Do you feel confident using the newest instructional technology available ?" also had a mean rating of 3.0. This indicates a neutral response.

### SUMMARY

Chapter IV provides the results of the survey administered to answer the research goals. Eighty-two out of one-hundred teachers responded to the survey for an 82 percent response rate. The survey was then analyzed to determine the mean responses based on a Likert scale for each question (See Table 1). Chapter V will provide the Summary, Conclusions and Recommendations of the study.

TABLE 1  
 A STUDY TO DETERMINE THE IMPACT OF INSTRUCTIONAL TECHNOLOGY ON  
 TEACHERS IN THE DEVELOPMENT OF CLASSROOM INSTRUCTION  
 QUESTIONS 1 THRU 5

Item No.	Item	Number of Responses	Mean
1	Do you use instructional technology in the classroom?	82	4.2
2	Do you have access to instructional technology for your particular course?	82	3.7
3	Should teachers have more input in the selection of instructional technology for their classroom?	82	4.9
4	Has your school system informed you of available instructional technology related to your course?	82	3.5
5	Are you considering instructional technology materials during course planning?	82	4.2

TABLE 1 Continued

A STUDY TO DETERMINE THE IMPACT OF INSTRUCTIONAL TECHNOLOGY ON  
TEACHERS IN THE DEVELOPMENT OF CLASSROOM INSTRUCTION

QUESTIONS 6 THRU 10

Item No.	Item	Number of Responses	Mean
6	When selecting a topic for instruction do you seek instructional technology to reinforce content?	82	3.8
7	Has your in-service instructional technology training been effective?	82	3.1
8	Do you feel the use of instructional technology helps students learn subject matter?	82	4.8
9	Does your school system provide regular in-service in using instructional technology?	82	3.0
10	Do you feel confident in using the newest instructional technology available?	82	3.0

## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The problem of this study was to determine the impact of instructional technology on Hampton Roads' area teachers on the development of classroom instruction. This chapter summarizes the procedures used in this research, draws conclusions about the findings of the study, and makes recommendations based on these research findings.

#### SUMMARY

Several proposals have been put forth mandating the use of instructional technology. One offered by the presidential administration calls for an information superhighway where teachers can access millions of pieces of information. However, to participate in this process, a knowledge and understanding of the instructional technology available is necessary.

Through several in-service training programs, the Consortium for Interactive Instruction (CII) offers excellent opportunities for teachers in the Hampton Roads area to obtain valuable skills in instructional technology. Seminars are presented to help teachers gain confidence in using instructional technology, present ways to use instructional technology in planning, and to develop the use of instructional technology in the classroom.

Experts have stated that the understanding and using of instructional technology at a personal level will help teachers to develop more confidence in using IT. Teachers may then be better prepared to use IT in the classroom.

A survey instrument was developed to determine the impact of instructional technology on Hampton Roads area teachers on the development of classroom instruction. The survey was distributed and conducted at the CII fall conference. Eighty-two participates responded out of one-hundred surveys distributed.

## CONCLUSIONS

Using the data presented in Chapter IV of this study, several significant conclusions based on the stated research goals can be made.

1. Do teachers currently use instructional technology in the classroom?

It is the conclusion of this study that a majority of Hampton Roads area teachers currently use some form of instructional technology in the classroom. But many are not. If the teachers had more input and control over material they could select, combined with in-service training, teachers would more readily use IT in the classroom.

2. Do teachers consider using available instructional technology during course and lesson planning?

The study concluded that teachers are not highly considering the use of available instructional technology during course and



lesson planning. They are, however, highly in favor of having more information as to what IT is available to them. If this information was made more readily available, teachers have shown an interest in using IT materials in course and lesson planning.

3. Do teachers feel confident enough to use instructional technology in the classroom?

The study concluded that teachers are not highly confident in the use of technology in the classroom. However, teachers have shown a highly favorable interest in more in-service training which could improve their confidence level in using IT.

## RECOMMENDATIONS

Based on the results, observations, and conclusions of this research, the following recommendations were submitted:

1. The Consortium of Interactive Instruction continue to provide quality training in instructional technology.
2. On-site in-service training should be increased in order to provide more easily accessible teacher training in IT.
3. Teachers should be provided more information on what IT is available for use in course planning.
4. Teachers should have more teacher input into the selection of IT materials/software.
5. A follow up study be conducted to determine if there is any significant change in the impact of instructional technology on teachers.

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## APPENDICES

APPENDIX A - Sample of Cover Letter

APPENDIX B - Impact of Instructional Technology Questionnaire

APPENDIX C - Description of Survey Respondents

November 20, 1993

Dear Conference Participant,

You have been selected to participate in a survey concerning the impact of instructional technology in education. It should take only a few minutes to complete.

Your participation and cooperation is appreciated. Your responses are of the utmost importance to the outcome of this research, so please consider each question carefully. Your answers will remain anonymous.

The Consortium for Interactive Instruction is not conducting this survey. However, they did provide support in allowing it to be conducted at the Technology in Education Conference.

For the purpose of this study, instructional technology shall be defined as videos, computers, laser discs, CD-rom, and multi-media.

When completed, please return the survey to your instructor. Thank you for your cooperation and participation in this valuable survey.

Sincerely,

George Everett, Jr.

### Impact of Instructional Technology Questionnaire

**Purpose:** This study is being conducted to determine the impact of instructional technology on teachers.

**Directions:** Please respond to the following questions by circling the most appropriate number. One indicates a low or least favorable rating and 5 represents the highest or most favorable rating.

1. Do you use instructional technology in the classroom?

1                      2                      3                      4                      5

2. Do you have access to instructional technology for your particular course?

1                      2                      3                      4                      5

3. Should teachers have more input in the selection of instructional technology for their classroom?

1                      2                      3                      4                      5

4. Has your school system informed you of available instructional technology related to your course?

1                      2                      3                      4                      5

5. Are you considering instructional technology materials during course planning?

1                      2                      3                      4                      5

6. When selecting a topic for instruction do you seek instructional technology to reinforce content?

1                      2                      3                      4                      5

7. Has your in-service instructional technology training been effective?

1                      2                      3                      4                      5

8. Do you feel the use of instructional technology helps students learn subject matter?

1                      2                      3                      4                      5

9. Does your school system provide regular in-service in using instructional technology?

1                      2                      3                      4                      5

10. Do you feel confident in using the newest instructional technology available?

1                      2                      3                      4                      5

What grade level do you teach?                      K-5                      6-8                      9-12

In what school system do you teach? \_\_\_\_\_

### DESCRIPTION OF RESPONDENTS

The respondents for the survey were from among teachers and Library Media Specialists who were attending the Consortium for Interactive Instruction's fall conference on November 20, 1993.