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AN ASSESSMENT OF THE TEACHING OF TECHNOLOGY IN ELEMENTARY SCHOOLS OF EAST CENTRAL ILLINOIS

PETER R. McCLURE

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AN ASSESSMENT OF THE TEACHING OF TECHNOLOGY IN ELEMENTARY SCHOOLS OF EAST CENTRAL ILLINOIS

(TITLE)

BY

Peter R. McClure

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

Master of Science

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

1983

YEAR

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING
THIS PART OF THE GRADUATE DEGREE CITED ABOVE

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AN ASSESSMENT OF THE TEACHING OF TECHNOLOGY IN ELEMENTARY SCHOOLS OF EAST CENTRAL ILLINOIS

THESIS

Submitted To The Graduate School
Of
Eastern Illinois University

In Partial Fulfillment Of The Requirements For
The Degree Of Master Of Science

By

Peter R. McClure

1983

ABSTRACT

This study was designed to gather empirical data regarding the study of technology in the elementary school. For this research the fifth grade level was explored in four elementary schools located in east central Illinois. The problem of the study was to develop a method of assessing the current status of the teaching of technology in the elementary schools of Illinois.

A literature review was conducted to gather information concerning the historical development of the study of technology at the elementary school level. With the information uncovered in the literature review, some common criteria were developed to identify the study of technology in the elementary school. These criteria were then formulated into teacher competencies.

A delphi search was conducted to identify experts in the area of the study of technology at the elementary school level. Once identified, the seven experts were asked to rate the initial teacher competencies and add additional competencies to the list if they deemed it appropriate. The experts evaluated the competencies through two rounds of investigation.

An observation checklist was developed as part of an assessment instrument to assist in the recognition of the teaching about technology in the elementary schools. A total of six hours observation time was compiled over two separate visitations to the schools involved in the study.

The teacher competencies developed from the delphi study were

later incorporated into one part of a two part teacher questionnaire. The first section of0the questionnaire asked the teacher to respond to questions concerning demographic data and their perceptions about the study of technology. The second section of the questionnaire utilized the teacher competencies developed by the experts in this study. This part of the questionnaire asked the teachers to perform a self evaluation of their teaching of technology utilizing the competencies specified. The questionnaire was another part of the assessment instrument developed fos this study.

To gain knowledge about another area of the study of technology at the elementary school level, interviews were conducted with the principals of the schools involved in the study. The interview consisted of technology in their school districts. Other questions covered the topics of inservice and activities and flexibility of the teacher to incorporate activities involving the study of technology. The administrator interview comprised the third section of the assessment instrument developed for this study.

The data was collected and an analysis was conducted to portray the current status of the study of technology at the elementary level for the schools involved in the study. A summary of the data showed that the elementary school teachers involved in the study were unaware of activities that encompassed the study of technology. The teachers and administrators were receptive to learning more about this content area. Teachers also felt they were involving some of the content about technology into their teaching.

Recommendations were also docueented to assist in the future

implementation of the study of technology for schools of east central Illinois. Some of these recommendations included better educating the administrators in the area about the study of technology. This could be accomplished by presenting information at regional administration workshops. Another thought would be to better design college courses for elementary school teachers to provide them with activities to represent the technological world in which we live. Inservice activities should be undertaken to educate the teachers around the area about the benefits of involving the study of technology in their presentations to students. The Illinois State Plan should develop activities for this level that are short in length, should be well tested, and specifically designed for the teacher who is unfamiliar with this content area.

This study provides a base in which to explore further in this subject area. It was intended to provide exploratory information about the study of technology at the elementary school level and its identification.

ACKNOWLEDGEMENTS

This thesis and the research that is incorporated within, is the result of the contributions of many individuals throughout the past year. The author would like to thank the participants involved in this study which include; the people who were surveyed, the experts who were identified, and the teachers and administrators of the schools involved. These people played a valuable role in the formation of this research and their cooperation is sincerely appreciated.

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PLH

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

CHAPTER I

The history of humankind has never experienced such rapid and dramatic change as that which has been caused by technology (Hoots, 1974, p. 221). Technology is affecting humans to a greater extent each day. Consequently it would be beneficial to humankind if people could identify and comprehend the ramifications of technology. One method to assist understanding is through education, which will prepare the youth of today and tomorrow to make rational decisions regarding the effects of technology upon their lives. Scobey (1968) states that providing the kind of education to help students cope with the social, economic, and political aspects of modern inventions is one of the greatest challenges to modern education. Heasley (1974) also points out that teaching about technology in a technological world must become a major concern of our nation's educational system if all students are to be adequately prepared for the present and future.

If one believes that the study of technology is important, then the earlier students are exposed to the study of technology, the better they may comprehend the role technology plays in our society. The elementary school does provide this opportunity for exposure of the student to the study of technology. At the elementary school level, the major emphasis for young children is not to teach a method of earning a living but to provide knowledge and skills necessary for a life in a technological culture (Scobey, 1968, p. 7).

In recent years there has been a renewed interest in the study of technology in the elementary school classroom. With this increased

interest, there has been a desire to develop and implement innovative curricula at this level. The work done by Peterson (1979) and the Virginia Department of Education (1977) has shown a desire to develop new curricula at the elementary school level which reflects a technological society.

Statement of the Problem

The problem was to develop a method of assessing the current status of the teaching about technology in the elementary schools of Illinois. Before developing new or modifing existing curricula, it is necessary to first assess the present curricula. This assessment involves evaluating the content of what elementary school teachers are currently teaching about the study of technology. Individual elementary schools, teachers, and grade levels should be different in their approach to the subject matter. However, there are common criteria for identifying the study of technology in the elementary school. This study was an attempt to identify criteria and develop an assessment tool.

Rationale

With the increased interest in the study of technology, a need exists to obtain information concerning the current status of the teaching about technology at the elementary school level. The gathering of empirical data may also better facilitate the understanding of what is being taught in the elementary school classroom. In addition, before writing curricula about the study of technology, a method of assessing the existence of

technology education at the elementary school level would be beneficial.

One immediate advantage for the development of an assessment instrument would be to assist in the research currently being conducted by the Illinois State Plan for Industrial Education Curriculum Project. The individuals working on this plan are attempting to develop innovative curricula from kindergarten through post secondary education. Information that would be assembled by this study could prove to be useful to the people concerned with the Illinois Plan.

Curriculum development should involve everyone that may be affected by its implementation. Information that has been collected for this study will involve the people that will be directly affected. These are the teachers and the local school administrators who will ultimately have to implement such a curriculum. It was advantageous therefore, to gather information about the study of technology from these individuals.

Overview of the Study

Chapter 2 was devoted to tracing the development of technology education in the elementary school and reviewing the literature related to assessment methods.The methodology of the study was discussed in Chapter 3. An analysis of the pertinent data related to the study was reviewed in Chapter 4. The discussion conclusion, and recommendation of the study was addressed in Chapter 5.

Definition of Terms

1. Assessment - An appraisal or evaluation. (Webster's Dictionary, 1974).

2. Concept - An idea that includes all that is characteristically associated with, or suggested by a specific term. (Webster's Dictionary, 1974).

3. Curriculum - Usually contains a statement of aims and of specific objectives; it indicates some selection and organization of content; it either implies or manifests certain patterns of learning and teaching, whether because the objectives demand them or because the content organization requires them. It also includes a program of evaluation of the outcomes (Taba, 1962, p.10).

4. Delphi Study - Is characterized as a method for structuring a group communication process so that the process is effective in allowing a group of indiviuals, as a whole, to deal with a complex problem (Linstone & Turoff, 1977, p. 3).

5. Industrial Arts - Is a comprehensive educational program concerned with technology, its evolution, utilization, and significance: with industry, its organization, personnel, systems, techniques, resources, and products and their social/cultural impact (Jackson's Mill Industrial Arts Curriculum, 1982).

6. Industry - Is that section of the societal economic institution that utilizes resources to produce goods, services, and information to meet the needs and wants of the individuals and society (Jackson's Mill Industrial Arts Curriculum, 1982).

7. Technological - Resulting from improvements in technical processes that increases productivity of machines and eliminates manual operations or operations done by older machines, (Webster's Dictionary 1974).

8. Technological Literacy - Is the knowledge and experience that may be helpful to posess to perform and effect positively, the society and

environment in which one lives as the utilization of technology develops.

9. Technology - A process undertaken in all cultures (a universal), which involves the systematic application of organized knowledge (synthesis) and tangibles (tools and materials) for the extension of human faculties that are restricted as a result of the evolutionary process, (Pytlik, Lauda, & Johnson, 1978, p.6).

10. Technology Education - Is the study of technology, its history, growth and future development as they relate to industrial organization, materials, tools, processes, occupations, products, and problems. It includes multi and interdisciplinary, academic and laboratory endeavors that help students explore their technological world, realize their responsibility therein, and better cope with the cultural change caused by technological advance, (Wright, 1981, pp. 19-20).

CHAPTER 2

Development of Technology Education In The Elementary School

The development of the study of technology at the elementary school level can be traced back two centuries. The foundational principles for the study of technology may also be identified by researching the development of technology education in the elementary school. Therefore before any development or assessment of curricula at the elementary level is attempted, it is appropriate to review the history and content areas of the study of technology at the primary grade level. To adequately assess the content for the study of technology in the elementary school, previous knowledge of past and existing technology education programs and developments would be benefical to the curriculum developer and classroom teacher.

Early Influences: Although elementary schools in the United States did not take formal shape until the early 20th century, early impacts on our educational system were felt from European sources. Philosophical foundations of the American elementary schools date back to the 18th and 19th centuries. These thoughts helped shape the modern structure of educational theory today.

One of the early advocates of a comprehensive education for children was Martin Luther. Luther stated in the early 1500's (Bennett 1926) that a child should go to school one or two hours a day, and learn a trade at home for the rest of the time. Previous to this approach children were just trained for a trade, except for the children of the upper class. Luther advocated that school should involve a comprehensive curriculum

which included Latin, Greek, Hebrew, logic, mathematics, music, history, and science as they were understood at the time.

In the 1500's, Rabelais, a physician and social philosopher of the time, did not agree with the approach to education that the schools were taking. In the Gargantua, Rabelais indicated (Boyd 1961), his theories on teaching and explains that his students participated in games and other activities that enhanced their educational experience. Knowledge of handicrafts and industries were further gained by taking the students on field trips into the local community.

Two centuries later, Jean Rousseau (1712-1778), outlined his ideas for education in his classic work Emile. Rousseau's theories revolutionized educational thought by making children the center of the educational thought process (Miller, 1979, p.45). Rousseau's thoughts on learning were described as learning through the hands as the gateway to the mind. He believed that the maturation of a human being is a progression of stages evolving from birth to adulthood. Rousseau laid the foundation for progressive education as his educational theory to be followed by other educational theorists (Miller 1979, p.46). As a result he had substantially influenced contemporary educational philosophy and practice of the 20th century (Frost & Bailey, 1973, pp.306-314).

Johann Heinrich Pestalozzi (1746-1827), father of modern elementary education, developed a system of educational theory and practice from which industrial education borrowed heavily during its formative years (Barlow, 1967, p. 22). Pestalozzi was a strong advocate of obtaining knowledge through experience. He placed an emphasis upon the study of industry as a means of general education. Pestalozzi's philosophy (Miller, 1979) was built upon the idea students were three-part beings, consisting

of a mind, heart, and body. He thought that education should consider all of these important areas.

One of Pestalozzi's students, Friedrich Froebel of Germany, was the originator of the kindergarten in 1839. Froebel believed that children should gain their sense of identity in play and this activity was necessary for the child to develop. Froebel believed that handwork stimulated all other learning, and that doing led to knowing (Gerbracht & Babcock, 1969, p.7). Froebel did not direct these handwork activities, but allowed students to build and learn through their creativity. His work in developing the kindergarten involved ideas about self activity, sense perception, nature, God, the universe, and the mystical power of unity (Barlow, 1967, p. 25).

Many of the previously mentioned European thoughts and influences about general education were employed in the United States during the late 1800's. Other factors also effected the change of Industrial Education during this time. Two factors that were influential in Industrial Education of the day were the Manual Training and Sloyd programs of education. Two gentlemen that were important in developing the European Sloyd and Manual Training factions of the Industrial Education movement were Otto Saloman and Victor Della Vos. Saloman was the director of Sloyd education in Sweden. Sloyd was eventually implemented in various forms in the United States. Saloman (1896) states that Sloyd was not a branch of technical education but belongs purely to general education. Victor Della Vos shared his work involving instruction in the Russian schools with educators from the United States. Della Vos is given credit for developing methods of instruction involving forms of practical education. Saloman and Della Vos were two of many people from outside

the United States who had an impact upon the Industrial Education system in America at the turn of the century. The Industrial Revolution in the United States played a key role in the implementation of the Sloyd and the Manual Training movements because of the need and desire for simple skills to be included into the educational system to assist in the complete education of the child.

These men were the outside influences that shaped the modern educational thought of today. Luther, Rabelais, Rousseau, Pestalozzi, Froebel, Salomen, and Della Vos were also the foundation for the thought behind the movement for the study of technology in the elementary schools today. These gentlemen initiated the thoughts of teaching the individual an interdisiplinary approach to education. They also led the discussions of industry's social/cultural impacts, and the understanding that a minds on and hands on approach to education would prove to be benefical to the student.

Early American Developments: One of the most successful programs following Pestalozzian thought was developed by Sheldon (1823-1897) (Gerbracht & Babcock, 1969, p.8). Sheldon was superintendent of schools in Oswego, New York. In 1861 he founded the State Normal and Training School at Oswego, to train teachers and young children to work with tools and materials.

Another program established during the 1800's in New York City was a kindergarten introduced by Felix Adler and patterned after Froebel's school. This was the first free kindergarten in America. Adler thought that various concepts of educational value were better understood by children through experiences as they related to physical activities and he built his elementary curriculum around this premise, (Bennett, 1926). He

felt, for example, that aesthetic values and mathematical and physical principles would be better taught by working with material things (Gerbracht & Babcock, 1969, p.9).

Around the turn of the century a variety of changes were taking place. With the advent of the Industrial Revolution, various forms of elementary education were being practiced. Programs ranged from a variety of Sloyd to a mixture of Manual Training. At the elementary school level, there was not any continuity on what programs to establish. Gerbracht and Babcock (1969) stated during the period 1890 to 1910, three main criticisms of manual training were voiced. One of these criticisms held that too much emphasis was placed on developing skills and not enough on providing information related to skills. Another criticism was that little or no attention was given to the design of the articles. A third criticism was that no attention was given to relating construction activities to the rest of the curriculum, even where the connection was obvious. In other words, the shopwork idea spread, but the rationale was too often left behind.

Manual Training was to encompass a variety of areas but it did not work out. Woodward (1898) states that he had no fear for the survival of Manual Training under the care of discreet and competent teachers. A change occurred at this time because Manual Training did not offer a justified program at the elementary school level.

The name of the profession was eventually changed to Manual Arts and some progress was made in developing a revised curriculum to fit the needs of the elementary school. By the turn of the century, John Dewey had entered the educational arena. Through his work at the University Elementary School in Chicago, Dewey used the term "industrial

occupations" as teaching methods for all subjects. Dewey formed the ideal rebuilding of educational thought for the study of technology in the 20th century. Mayer (1973) stated that Dewey was a strong advocate of self expression, problem solving, an interdisciplinary approach to education and the use of practical knowledge to enhance our learning process. As Gerbracht and Babcock (1969) stated construction activities as a part of general education were expanded to include not only development of skills, but also an appreciation and understanding of industry and intelligent selection and use of industry's products.

Dopp (1902) stated the historical aspects of industrial activities represented a fundamental factor in the education of the child. Robert Row (1909), another student of Dewey, stated that Manual Arts provides occupations that have a definite aim at looking at the production of an object that the children feel is worthwhile. This occupation or the object may encompass a variety of activites. The influence of Dewey upon the development of technology education in the elementary school is very strong. The ideas and activities of Dewey are still used today, and his ideas were the inspiration of many to follow.

Modern Thought: The establishment of the philosophical base for the existance of industrial arts in the elementary school is attributed to the work of James Russell and Frederick Bonser at the Teachers College during the early 1900's (Miller, 1979,p.50). Their philosophical thought was based on the fact that industrial arts should be a discipline that revolves around the industrial processes that are fundamental to the survival of all people. Bonser and Mossman (1923) stated that the context of Industrial Arts in the elementary school was to relate students to industries and their products and to use these products intelligently and

humanely. General aims of the study of industrial arts are under five terms: health, economic, aestheic, social, and recreational values (Bonser & Mossman, 1923, p.21). Development of skills are left for a later period under their plan. Bonser and Mossman were leaders in the application of John Dewey's social philosophy related to the elementary school program through Industrial Arts. Bonser conceived of the studies of materials, processes, conditions of production, and the intelligent use of products to help develop understandings and appreciations by elementary school students of their society.

Frederick Bonser and Lois Mossman played a key role in the establishment of Industrial Arts at the elementary school level. Ideally, the activities and thoughts expressed by Mossman and Bonser are essentially the same thoughts that involved the study of technology in the elementary school today. Their work is consistently reviewed to modify existing programs and help facilitate change. Content of their original programs have been infused into modern education under a variety of names.

From approximately 1925-1950 there were very few changes in the development of elementary school Industrial Arts. A number of developments within the profession, such as the establishment of the American Industrial Arts Association (AIAA) helped support the profession in the area of elementary school Industrial Arts.

In 1934 William Warner produced a paper entitled The Ohio Prospectus. This was a move for the redirection of Industrial Arts. Little change resulted from this monumental document, though it is considered to be the "birth certificate" for Technology Education today. After World War II, Warner presented a paper during the AIAA convention of 1947.

This topic was entitled Curriculum to Reflect Technology. Warner proposed curriculum divisions into power, transportation, manufacturing, construction, communication and management (Warner, 1965, p.5). Warner also advocated the formation of cluster courses that are the foundation of the study of technology today. These documents presented by Warner were the beginnings of the formal technology education movement of today. Warner's thoughts were not directed specifically at the elementary school level but the ideas of the curriculum encompassed all levels of the profession.

> Since 1950 many colleges and universities have established courses in Industrial Arts for the elementary school teachers and six books were published specifically for the purpose of facilitating the preparation and inservice development of elementary and special education teachers in the area of Industrial Arts at the elementary school level (Miller, 1979, p.51).

These courses however, usually involve the study of crafts activities for the elementary school teacher. Researching the American Council of Industrial Arts Teacher Educators Directory, (ACIATE) seldom is their any mention of the study of technology for elementary teachers at the college level.

An important development that took place in 1962 was the formation of the American Council of Elementary School Industrial Arts (ACESIA) chapter of the AIAA in 1962. This organization helps provide the teacher educator and classroom teacher with current material in the field of elementary school Industrial Arts. During the 1960's two of the most prominent authors and activists in the elementary Industrial Arts movement were Mary-Margaret Scobey and Elizabeth Hunt. These

individuals wrote textbooks and provided valuable leadership in the profession to promote the study of technology in the elementary school.

Also during the 1960's there were a number of various forms of elementary school Industrial Arts programs across the United States. Many of the programs or content areas, originally supported by Dewey, Bonser, and Mossman were now infused into existing courses or were used to help integrate between other areas of study. These new programs attempted to relate the study of technology to the existing elementary school program. Each of the developments that led to contemporary elementary school technology education has been a valuable step to where the profession stands today.

Contemporary Programs: During the 1970's there were a number of innovative elementary school technology education programs. One such program that involved the study of technology was developed in the early 1970's by the Summit County Board of Education in Ohio. Norma Heasley was the director of the project that was entitled " A Technological Exploratorium K-6."

> The program consisted of three stages: First stage (K-1) was concerned with technology and the individual and the introduction of the student to tools, materials, research and development. The second stage(2-4) was involved in explaining technology and the individual's environment,and understanding human interaction through technology, and interpreting the environment through technological developments. The third level (5-6) involves the effects of technology on man and society, also the evolution of technology, (Summit County School Board, 1973, p.7).

The purpose of "A Technological Exploratorium, K-6" was to strengthen the elementary school curriculum through the interdisciplinary involvement of the students and teachers in a variety of experiences. This program focused on the topic of utilizing all aspects of technology education, to provide new ideas to the student for learning both in and out of the classroom.

Another program developed in the late 1970's was by the Industrial Arts Educational Service of the Department of Education in Virginia. This program, designed for the K-6 level, included the study of technology, attitude development about technology, and a technological awareness by the student. These concepts are integrated into the total curriculum to reinforce existing areas of study and are student centered rather than teacher centered.

The New Jersey State Department of Education developed another program in 1970, entitled Technology 4 Children. Brunelle (1977) states that the New Jersey Technology 4 Children (NJT4C), program was established to foster an awareness by the utilization of "hands on " activities for the student to develop. This program is devoted toward the project and career awareness activities. However, the program is designed with a broad base concept to study technology.

A more recent innovative program was developed by Richard Peterson while serving as consultant to Project Open program at Paden City,West Virginia Elementary School, 1976-1979. Content of the curriculum was specifically technology oriented and was implemented by elementary school teachers. This curriculum was not designed to emphasize the tools and materials aspect of technology because of the belief that the field of

technology encompasses far more (Peterson, 1980, p.15).

Peterson stated that a broad understanding of the role that technology plays in our culture and the impact that it has upon people is essential if we are to manage our technology wisely. He included four major areas to develop this understanding which were: the technological process;study of the role that technology has played in history and will play in the future; assessment of selected technological issues; and the study of technical elements that contribute to the effective functioning of an individual in our technological society. The technological literacy of the student is addressed throughout the curriculum. Peterson utilized the systems approach using transportation, communication, and production to clarify the study of technology. The curriculum was developed around a concept that related technology with other discipline areas within the school. This technique involved the relationships between technology and other elements within a specific unit of study.

The contemporary programs that were outlined provided an optimistic picture for the implementation of the study of technology in the elementary school. An introduction of contemporary programs, illustrated that technology can provide an appropriate curriculum base in our technological society. These programs utilized a form of the systems approach to the study of technology. The programs were all student oriented, interdisciplinary in nature, provided the learner with problem solving skills, and were designed to expose the student to the affects of technology on society. Although, contemporary programs such as these are more the exception than the rule, the study of technology at the elementary school level has been successfully implemented and may be instrumental for future development.

Future Outlook: Margaret Mead stated (Heasley 1974 p.48), "We must educate people in what nobody knew yesterday, and prepare people for what no one knows yet, but which some people must know tomorrow". This is the direction we must funnel our resources into to enhance the future development of technology education in the elementary school. Work has already started on some future programs. One such program is the "Futuring Project" of New York state. Miller (1982 p.4) stated that this project is developing a curriculum or a process to meet the needs of an industrial system in which a spectrum of new technologies are emerging that require new job skills and where the working environment, family life styles, and value systems are in a state of flux.

Starkweather (1975) suggested the curriculum of the profession will become more interdisciplinary and more systems oriented in the future. DeVore and Lauda (1976) also stated that new instructional strategies must be designed to provide for authenticity in the study of technology. With these thoughts toward future development, a few points stand out above the rest. An interdisciplinary approach to education should be provided and new strategies to approach the teaching about our technological world should be developed. The elementary teacher must be flexable and able to adapt to a number of different teaching styles. The curriculum base that the program is built upon is one designed around the study of technology. The program should attempt to develop a technological awareness by the student. A systems approach to the teaching of technology should also be utilized. The future oriented program will attempt to be student centered and allow the student to do more problem solving. The key aspect of the future oriented program will be to expose the student to the social/cultural aspects of a technological

world.

Summary: The development of technology education in the elementary school can be traced back to the European scholars of the 16th-19th centuries. Individuals such as Luther, Rabelais, Rousseau, Pestalozzi, Froebel, Salomen, and Della Vos were instrumental in their contributions to the development of early forms of technology education in the elementary school. Leaders of the movement in the United States include Sheldon, Adler, Woodward, Dewey, Russell, Bonser, Mossman, Warner, Hunt, Scobey, Heasley, and Peterson.

Although the activities have changed to some extent from the early developments, many of the same criteria have remained. One reason to trace the historical development for the study of technology in the elementary school is to identify that a natural progression has occurred. Through this natural progression, a common base for the study of technology in the elementary school has been identified.

Some of the criteria that have been consistantly reoccurring throughout this chapter are:

1. An interdisciplinary approach to the subject matter.
2. Student centered program (develop a "whole person concept).
3. Systems approach to curriculum development.
4. Flexability of the teacher (adaptability of the teacher).
5. Develop a technological awareness.
6. Develop problem solving skills.
7. Learning through practical means (minds on and hands on approach).
8. Development of technological literacy.

9. Development of creativity (design and self expression).
10. Develop a career and consumer awareness.
11. Develop an understanding of the evolution of technology.

The criteria are defined as they represent the study of technology at the elementary school level. An interdisciplinary approach to the subject matter is of great importance to the elementary school teacher. The study of technology can be designed to relate or fuse together other disciplines. For example, through the study of transportation a number of other subject areas may also be incorporated into the program. An appropriate reading lesson may be presented, math problems may possibly relate to bus schedules, a science lesson could involve studing various fuels , and a technology education activity may be to build a model of a future transportation system and explain how it could affect the environment.

A student-centered program would involve creating more activities that would allow the student to perform more tasks. Often lessons are designed around teacher activities and the student is idle. A better designed program would allow the student to explore and develop a conception of other areas of study. This would broaden the child's outlook on their world.

The systems approach to technology-based education is designed into content areas. Snyder and Hales (1982) state these areas as communication, transportation, manufacturing , and construction.

Flexability of the teacher represents an adaptability to be able to teach a number of different content areas. The competency of the teacher will increase as they seek to broaden their perspective and allow

students to participate in a variety of activities. The search to keep up to date on activities by both the student and the teacher will allow both to prosper. Often the better the teacher is able to adapt, the more successful the teacher shall become.

The development of technological awareness by the student is a growing phase of development. The awareness includes understanding the impacts that technology has upon our society and culture. These impacts include environmental, social, and cultural. The student will gain an understanding of technology and develop values to assess the appropriate use in our society.

Developing problem solving skills is an important aspect of the study of technology. Allowing the student to think and work out problems and to develop a process to solve problems is an important skill. In the future the ability to adapt will include the ability to solve problems intelligently.

Through the study of technology the student is able to learn by practical means. By allowing the student to gain knowledge through experience the student may better comprehend the subject matter presented. This is an unique advantage of technology education in the elementary school and one that should not be overlooked.

Technological literacy is a criteria incorporated in the study of technology at all levels. In the elementary school the child should be able to communicate and develop an understanding of technology in the world. This skill is vital for the child to develop in our technological society.

The development of creativity is fostered by allowing the student to explore. This means through design activities and letting the students use their imagination creativity may flourish. These activities are vital for

future growth and development of the child.

The study of technology can expose the student to a number of careers in our world. Discussing the world of work and what types of opportunities are available are definite advantages for the study of technology. The understanding of technology also provides a means to develop a consumer awareness. All elemenary school children are consumers in our society and education should provide the information to make intelligent decisions as a consumer in our society.

Through the evolution of technology the student may learn from the past and recognize possibilities for the future. The student may better understand the technology of the present and realize the impacts upon contemporary cultures.

These common criteria form the basis for the study of technology in the elementary school. By researching the historical development of the study of technology at the elementary school level, one discovers some common criteria that may be incorporated in future curriculum development at this level. With these principles as a foundation, one may attempt to develop an efficient assessment tool to identify the study of technology at the elementary school level.

CHAPTER 3

Methodology

To ascertain the existence of the study of technology at the elementary school level, a method of evaluation should be developed. The evaluation may include a number of different assessment methods. In this chapter, one group of methods are analyzed and related to the study. This group of methods was chosen after a secondary review of literature was conducted in the area of assessment methods. The sample population for the research is specified and the procedures of the study are documented in this chapter.

The Sample

The major purpose of this study was to develop and validate a method of assessing the teaching of technology in the elementary school. A sample population to accomplish this task was selected from elementary schools of east central Illinois. These schools were primarily selected for their accessability and the cost considerations involved in traveling to the schools.

The fifth grade level was selected for participation in this study. At this level the (9-11) year old student should have some basic concepts about technology and it's role in society. Consequently the teaching of technology in the fifth grade should be evident if it is actually taking place. Four schools were selected to participate in this study. These

were:

1. Wentz Elementary School, Paris, Illinois.
2. Kansas Elementary School, Kansas, Illinois.
3. Jefferson Elementary School, Charleston, Illinois.
4. Oakland Elementary School, Oakland, Illinois.

Each school represents diverse communities within the east central region of Illinois. The populations of these communities range from approximatily 800 - 20,000 in size. All of the classrooms observed for this study had 20 or more students present.

Procedures of the Study

The following procedures were completed to assess the teaching of technology in selected elementary schools of east central Illinois. Steps were taken to test the assessment methods developed in this study. These procedures represent the actual points involved in successfully completing this study.

Expert & Competency Identification: A delphi study was conducted to identify experts in the field of technology education at the elementary school level. Sackman (1975) states that the delphi method is an attempt to elicit expert opinion in a systematic manner for useful results. Additional reasons for this method to be chosen for this study was it was inexpensive, would achieve relatively quick responses, was not difficult to administer to the experts in the field, and the results would involve a cross section of opinion from individuals regardless of location. The delphi

search will also provide current data about what the experts in the field consider to be important in the teaching of technology at the elementary school level.

A random selection process was undertaken to identify the experts. The American Council of Elemenatry School Industrial Arts (ACESIA), Membership Directory was utilized to randomly select forty individuals by their location of the country, to participate in the expert identification. The number of participants was also randomly designated. The letter, survey, and a list of the participants of this delphi search are in Appendix A. The members of the ACESIA, were to select the experts as the best qualified to identify the study of technology at the elementary school level. The members of ACESIA were asked to list up to 10 experts and rank them from (1) representing the most qualified to (10) representing the less qualified individuals. An individual received ten votes for a number (1) rating and one vote for a number (10) rating. The initial search was to identify only the five people who had received the most votes.

The five experts were sent a sample list of criteria which included ten (10) statements concerning the teaching of technology at the elementary school level. See Appendix B for a copy of the initial survey. These sample statements were derived from the criteria identified in Chapter 2. The experts were asked to respond to the ten (10) sample statements and write additional statements they felt necessary. The ten sample statements were:

1. Encourage the development of a technologically literate person.

2. Develop student centered activities to encompass the cognitive, affective, and psychomotor domains of the child living in a technological society.

3. Utilize a systems design to curriculum and relate an interdisciplinary approach to the subject matter in relationship to the study of communication, production, and transportation.

4. Assist in developing useful technical consumer skills by the student.

5. Encourage and support the effective use of leisure time in a technological society.

6. Develop a technological awareness of the effects of technology upon the individual, society, and the environment.

7. Exhibit a flexibility to adapt to change in curriculum content.

8. Attempt to develop problem solving skills by the students in the areas of communication, production, and transportation systems.

9. Utilize a method of teaching that includes practical and technical means, such as a minds on hands on approach.

10. Encourage the development of creativity through design and self expression in the areas of communication, production, and transportation systems.

The experts were provided with a validity scale in which to uniformly rate the competency statements. This scale was adapted from the National Material Advisory Board. See Appendix B for a copy of the Validity Scale. The scale accurately provides a means in which to assign a numerical value for a defined set of criteria. The numerical scale ranged from 1 through 5. The criteria associated with the numerical scale ranged

from No Importance to Great Importance. Each criteria was defined further by a brief phrase.

The first survey was sent March 24, 1983 and the results were tabulated there after. A second round was conducted on April 29, 1983. See Appendix B for a copy of the second letter. The second round of the delphi search included the initial ten (10) statements and the additional competencies that were documented by the experts from the first survey. See Appendix B for a copy of the second survey. The same validity scale was also utilized in the second round. The second round was tabulated and the results were recorded.

Assessment Instrument

The assessment instrument consists of three parts. These are observation checklist, administration interview, and teacher questionnaire. The instrument was developed to assist in the identification of the teaching of technology in the elementary school. A variety of methods were employed to assess the actual thoughts of the teacher and administrator about the study of technology and to observe those thoughts in practice.

Observation Checklist: The major advantage of utilizing a means of direct observation for this study is to collect data that is current and first-hand. This method was employed to allow the observer to accurately describe and record the surroundings and behaviors within the classroom.

The observation checklist was designed to allow the observer to comment on various aspects of a visitation to each elementary school classroom. See Appendix C for a copy of the Observation Checklist. The

observations occurred in the schools that were randomly selected in east central Illinois. These observations were between May 13, 1983 and May 20, 1983. Each school was observed twice, for a period of three hours each visit. One observation checklist was completed for each school. Observations were conducted by the researcher. The observer did not offer any input and sat quietly apart from the class.

Administration Interview: The second part of the assessment instrument was the administration interview. For this study the personal interview was conducted because of the small size of the sample population and accurate information was also needed from school administrators.

A total of six questions were asked of the school administrators. See Appendix D for a copy of the Interview Questions. These questions ranged from the emphasis of the school's curriculum content, to whether they had heard of the study of technology, to how the school district provides for inservice activities. The interviews were to be conducted in private and as concise as possible. Notes were to be taken as the individuals respond to each question. Once the interview was completed, a brief synopsis of the meeting was written.

Teacher Questionnaire: The teacher questionnaire is the third part of the assessment instrument. A questionnaire is a method of extracting information about a person and their behaviors or attitudes. For this study a questionnaire was selected because of the low cost and the ability to structure specific questions to the teacher relating to the study of technology in the elementary school.

The questionnaire is composed of two parts. Part one involves topics relating to the teacher's specific teaching situation, personal data, and

questions concerning the opinion of the teacher about the study of technology at the elementary school level were involved in the first section of the questionnaire. This section of the questionnaire was designed to be multiple choice and involved the teacher responding to eleven (11) questions. See Appendix E for a copy of the Teacher Questionnaire.

Section two of the questionnaire asked the teacher to self-evaluate their teaching about technology. This was accomplished by utilizing the list of criteria that was developed from the delphi search. The same list of twenty one competencies were used but the validity scale was changed. Teachers were asked to rate the competency statements according to their occurrence in their fifth grade classrooms. The scale still ranged from (1) to (5), but (5) now represented a statement or competency that was consistantly utilized and (1) represented one that was seldom utilized. See Appendix E for a copy of the second part of the questionnaire.

This questionnaire was administered to the four teachers of each school after the observations and the interviews were completed. Questionnaires were personally deposited in the individual teacher mail boxes at their respective schools. Included in the envelope was:

1. A copy of the questionnaire;
2. A cover letter with a brief explanation about the questionnaire;
3. A return addressed envelope.

All responses were returned by June 8, 1983. At this time the questionnaires were analyzed and tabulated.

Summary: The sample population, procedures used, and the assessment

instrument have been reviewed. The sample consisted of randomly selected schools in east central Illinois. The procedures consisted of a discussion of the steps followed through the completion of the study. The assessment instrument consists of an Observation Checklist, Administration Interview, and a Teacher Questionnaire. The results of this chapter will be discussed further in Chapter 4.

CHAPTER IV

Analysis of Data

The data collected for this research is categorized into four major areas. One area is expert and competency identification, another incorporates the three parts of the assessment instrument. These parts are an observation checklist, administration interview, and teacher questionnaire.

Expert & Competency Identification: The expert identification involved randomly sampling forty (40) members of the American Council of Elementary School Industrial Arts (ACESIA). A list of thee members sampled may be seen in appendix A. The initial survey requested the members to list experts in the field of the study of technology at the elementary school level. From this survey, twenty three (23) of the forty (40) members responded. This represents a return percentage of fifty seven (57) percent. Two (2) of the twenty three (23) returned surveys did not include any information. This represents a nine (9) percent return that stated that they knew little or nothing about the topic.

From this survey the participants identified seventy seven (77) individuals as experts in the field of the study of technology in the elementary school. Of the experts identified, seven (7) individuals were recognized the most by their peers. Initially five (5) experts were to be utilized but the returns significantly identified seven (7) individuals that stood apart from the rest. Therefore, these

seven (7) experts were asked and agreed to assist in identifying selected teacher competencies in the area of the study of technology.

The competency statements were identified by the experts through two rounds of inquiry. For a complete result of the first competency survey see Table 1.

Table 1

Elementary School Technology Education Teacher Competency

Statements: Survey #1

Scale

No Importance = NI = 1
Little Importance = LI = 2
Moderate Importance = MI = 3
Considerable Importance = CI = 4
Great Importance = GI = 5

Item No. Keyed to Competency Survey I, #1-10	Number of Responses	Average Value Total / 7
1. Encourage the development of a technological literate person.	1(LI) 1(CI) 5(GI)	4.4
2. Develop student centered activities to encompass the cognitive, affective, and psychomotor domains of the child living in a technological society.	2(MI) 5(GI)	4.7
3. Utilize a systems design to curriculum and relate an interdisciplinary approach to the subject matter in relationship to the study of communication, production, and transportation.	2(MI) 4(CI) 1(GI)	3.9
4. Assist in developing useful technical consumer skills by the student.	1(LI) 5(CI) 1(GI)	3.9
5. Encourage and support the effective use of leisure time in a technological society.	1(NI) 1(LI) 2(MI) 1(CI) 1(GI)	3.1

6. Develop a technological awareness of the effects of technology upon the individual society, and the environment.	5(CI) 2(GI)	4.3
7. Exhibit a flexibility to adapt to change in curriculum content.	2(LI) 3(MI) 1(CI) 1(GI)	3.1
8. Attempt to develop problem solving skills by the students in the areas of communication, production, and transportation systems.	1(MI) 4(CI) 2(GI)	4.1
9. Utilize a method of teaching that includes practical and technical means, such as a "minds on hands on" approach.	2(MI) 3(CI) 2(GI)	4.0
10. Encourage the development of creativity through design and self expression in the areas of communication, production, and transportation systems.	3(MI) 3(CI) 1(GI)	4.1

Competencies 1,2,6,8,9 and 10 were evaluated by the experts to be of considerable importance. The results were averaged on a five point scale. A copy of the validity scale may be seen in Appendix B.

A second competency survey was sent to the seven (7) experts to review. This survey included all of the additional competency statements that the experts included after the first round of inquiry. The second survey also included revisions in wording to the ten initial competencies. A copy of the second survey may be seen in Appendix B. For a complete result of the second teacher competency survey see Table 2.

Table 2

Elementary School Technology Education Teacher Competency

Statements: Survey #2

Scale

No Importance = NI = 1
Little Importance = LI = 2
Moderate Importance = MI = 3
Considerable Importance = CI = 4
Great Importance = GI = 5

Item No. Keyed To Competency Survey II, #1-21	Number of Responses	Average Value Total / 7
1. Encourage the development of a technological literate person. (General Competency)	1(NI) 6(GI)	4.4
2. Develop student centered activities to encompass the cognitive, affective, and psychomotor domains of the child.	1(LI) 1(CI) 5(GI)	4.4
3. Establish an interdisciplinary approach to the subject matter relating to the study of communication production and transportation.	3(MI) 1(CI) 3(GI)	4.0
4. Develop technical consumer skills by the student.	1(LI) 3(MI) 2(CI) 1(GI)	3.4
5. Encourage and support the effective use of leisure time by the student.	5(MI) 2(GI)	3.4
6. Develop a technological awareness of the effects of technology upon the individual society, and the environment.	1(MI) 2(CI) 4(GI)	4.4
7. Exhibit a flexibility to adapt to change in curriculum content.	1(NI) 1(LI) 2(MI) 1(CI) 2(GI)	3.3
8. Develop problem solving skills by the student in the areas of communication, production, and transportation.	1(MI) 4(CI) 2(GI)	4.1

9. Utilize a method of teaching that includes practical and technical means.	2(MI) 2(CI) 3(GI)	4.1
10. Encourage the development of creativity through design and self expression in the areas of communication, production, and transportation systems.	3(MI) 3(CI) 1(GI)	3.7
11. Develop skills and understanding of research and development through individual investigation.	2(LI) 2(MI) 2(CI) 1(GI)	3.3
12. Develop an understanding by the student to be a conscientious and critical consumer of resources.	3(MI) 3(CI) 1(GI)	3.7
13. Develop a conscious future studies program for further development of technological, societal, and environmental decision making.	1(LI) 2(MI) 3(CI) 1(GI)	3.5
14. Integrates other subjects and relates them to technology.	1(MI) 4(CI) 2(GI)	4.1
15. Assists with the child's cognitive, affective and psychomotor development.	1(MI) 3(CI) 3(GI)	4.3
16. Develop appropriate attitudes and values related to the world of work.	1(LI) 1(MI) 3(CI) 2(GI)	4.0
17. Develop healthy self concepts related to the world of work.	2(MI) 3(CI) 2(GI)	4.0
18. Help the students discover limitations and strengths related to the world of work.	1(LI) 4(CI) 2(GI)	4.0
19. Develop an awareness of the changing character and influence of technology on society and its culture.	2(LI) 2(CI) 3(GI)	3.9
20. Help students discover their own personal aptitudes.	1(MI) 3(CI) 3(GI)	4.3
21. Demonstrate (a given compliment of) technical skill in and knowledge of tools, materials, and processes.	1(LI) 1(MI) 2(CI) 3(GI)	4.0

The competencies identified in Items 11-21 represent statements added to the initial list of competencies by the experts. The second round of the survey further identified the validity of thee competencies. All of the twenty one competencies stated were averaged above the moderate range of importance. Competencies 1,2,3,6,8,9,14,15,16,17,18,20 and 21 were all in the range of considerable importance.

Assessment Instrument

Observation Checklist: Classroom observations were performed in the four (4) schools involved. An observation checklist was developed and completed for each of the schools that participated in the study. A copy of the checklist may be found in Appendix C.

The results of the checklists state that all four observation sites involved traditional forms of classroom organization. The teacher is seated in the front of the classroom and the student desks were arranged in straight rows facing the teacher. Of the classrooms observed the ratio of male to female students was approximately 1:1.

All classroom facilities had adequate lighting, individual desks for the students, and a small reference section within the classroom. However, the locations of the various classrooms within the schools were quite different. One facility was located within a high school. This particular classroom was located close to an existing Industrial Arts laboratory. A classroom was also located in a junior high school facility which housed an Industrial Arts laboratory. another

classroom was located in an elementary school facility that housed six fifth grades. Two sites were located in traditional elementary school settings. One of these classrooms was located in a building that was attached to the main facility by an external walkway.

The teachers involved in this study were all very similar in teaching methodology. This methodology involved teacher centered learning and did not involve a large amount of group or individual presentations to the class. All of the teachers seemed to be pressed for time to complete the academic year requirements and to prepare the students records for the following year. The teachers all observed to be well liked by their students.

All of the teachers utilized the current editions of textbooks. They also relied heavily upon workbooks to compliment the topics discussed in class. Limited use of visual aids were observed in all four teaching situations.

A variety of subject areas were observed being discussed in each of the schools. These include spelling, science, social studies, mathematics, and reading. During the observations only a limited number of topics or activities were discussed concerning the study of technology. One teacher utilized a part of a math class to work with calculators and discuss their use in society. Another teacher discussed the effects of the railroad upon society during the westward expansion of the 1800's in the United States.

Administration Interview: The interview was comprised of six questions. See Appendix D for a copy of a synopsis of the interviews.

The first question of the interview was concerned with the major emphasis of the curriculum for the fifth grade in their school district. All four administrators expressed that the areas of reading and mathematics were important and are the major emphasis in their districts. Three of the individuals also elaborated about the emphasis of computers upon the curriculum. These people mentioned that in the future a form of computer literacy may be added to the curriculum of the fifth grade. All the principals discussed the possibility in the future of having to identify specific competencies and related tests for each grade level. This minimum competency based education is not currently applicable to schools in Illinois, but all administrators mentioned other states where they are utilized. One principal stated that their district has been working on material in this area. The administrators surveyed said they did give students standardized tests, the most prevalent being the Iowa Achievement Test.

The second question asked the principals if they had ever heard of the study of technology at the elementary school curriculum in their area. All of the people interviewed stated that Industrial Arts was offered in their prospective junior high schools. The principals said they felt the study of technology was being discussed in the social studies class. While one principal elaborated further that some of the course content could be achieved through an introduction to computers. All of the people felt that the study of technology should be included in the curriculum content at this level.

Question 3 asked the administrators if the teacher has the option to include various activities associated with the study of technology in the classroom without administrative approval. All four principals replied the teacher could incorporate activities in this area without their approval. The administrators said they would be supportive of the teachers in this endeavor. Two people mentioned that this activity should not take the place of other subject areas. Another replied it would please him if the teachers took the initiative to attempt to be innovative and develop new activities. Another stated that most of the teachers would notify him if they were to add activities in this area.

The fourth question asked if the schools involved had any special facilities to assist the classroom teacher in implementing the study of technology at the elementary school level. All of the administrators mentioned the inclusion of computers in their schools as a partial answer to this question. Two of the schools were located in a building where Industrial Arts activities were currently taking place. Two others had no formal facilities in which to utilize. In the schools that had access to facilities, nothing had ever been done to attempt to utilize these facilities for the elementary school classes.

Question 5 asked the principals if there had been or would be a possibility of providing inservice activities that would help teachers include the study of technology activities in their classrooms. All of the administrators said that there had never been anything done in this area. However, they all expressed an interest

in possibly providing such an activity if it was something of worth for the teachers.

The sixth question asked the administrators if their districts gave credit or reimbursed the teachers for continuing their graduate work in education. All of the principals answered that their districts advanced the teacher for taking graduate courses by advancing them on a salary scale. One district also reimbursed the tuition cost of these courses to the teachers.

Teacher Questionnaire: The teachers involved in the study were asked to complete a questionnaire concerning the study of technology at the elementary school level. The questionnaire was comprised of the two major sections. A copy of the questionnaire may be found in Appendix E. The results of the first section are based on answers to the following eleven (11) questions.

1. What degree in the field of education have you attained?

Two of the people responded they had received Bachelor of Science degrees and two others stated they had attained Masters degrees. Therefore fifty percent of the teachers surveyed had received a Masters degree.

2. How many Industrial Arts or Technology Education courses did you take while you were in college?

Two teachers said they had taken (1-2) courses and two others replied they had not taken any courses in this area.

3. What is your yearly classroom budget for supplies?

One budget was in the 0-$50.00 range, two others in the

$50.00-$100.00 range, and a fourth answered $100.00 or more. This question provided some insight into current financial matters pertaining to teaching at the elementary level.

4. Have you taken a graduate course in the field of education within the last two years?

Three people replied that they had taken a course while another had not taken a course.

5. Have you ever been introduced to the study of technology at the elementary school level?

All four responses to this question mentioned stated they had never been exposed to this area of study.

6. Would you be interested in taking graduate courses that would expose you to the study of technology at the elementary school level?

Two people responded they would be interested and two responded they would not be interested in taking courses in this area.

7. If you expressed an interest in implementing a form of technology education in your classroom, would you receive the support of your administration?

Two teachers replied they would receive the support of their administration in this matter and two would not.

8. Would you be interested in an inservice activity that would show the benefit of implementing the study of technology at the elementary school level?

Three people were interested in an inservice activity in this area and one was not.

9. At this time, do you feel you are integrating the study of technology in your presentations to the students?
Two individuals stated that they believed they were and two stated that they were not incorporating the study of technology in their classroom presentations to students.

10. What is your current age?
Three of the people were in the (30-40) age bracket. While one teacher was in the (40-50) age range.

11. I the state board of education offered to provide you, the classroom teacher, with material and information regarding the study of technology at the elementary school level, would you utilize this material in your teaching?
All participants responded positively to this question.

The second section of the teacher questionnaire asked the teacher to self evaluate their teacher about technology utilizing the teacher competencies developed during this study. See Table 3 for a complete breakdown of the teacher responses to this section of the questionnaire and see Appendix E for a copy of the questionnaire.

Table 3

Teacher Questionnaire: Competency Self Evaluation

Seldom Utilized = SU = 1
Occasionally Utilized = OU = 2
Periodically Utilized = PU = 3
Frequently Utilized = FU = 4
Consistently Utilized = CU = 5

Item No. Keyed To Teacher Questionnaire: #1-21	Number of Responses	Average Value Total / 4
1. Encourage the development of a technological literate person. (General Competency)	2OU) 1(PU) 1(CU)	3.0
2. Develop student centered activities to encompass the cognitive, affective, and psychomotor domains of the child.	1(SU) 1(PU) 2(FU)	3.0
3. Establish an interdisciplinary approach to the subject matter relating to the study of communication production, and transportation.	1(SU) 2(PU) 1(CU)	3.0
4. Develop technical consumer skills by the student.	4(PU)	3.0
5. Encourage and support the effective use of leisure time by the student.	1(PU) 1(FU) 2(CU)	4.2
6. Develop a technological awareness of the effects of technology upon the individual society, and the environment.	3(PU) 1(CU)	3.5
7. Exhibit a flexibility to adapt to change in curriculum content.	2(PU) 1(FU) 1(CU)	3.8
8. Develop problem solving skills by the student in the areas of communication, production, and transportation.	1(SU) 2(PU) 1(CU)	3.0
9. Utilize a method of teaching that includes practical and technical means.	1(SU) 2(PU) 1(FU)	2.8

10. Encourage the development of creativity through design and self expression in the areas of communication, production, and transportation systems.	3(PU) 1(CU)	3.5
11. Develop skills and understanding of research and development through individual investigation.	1(SU) 1OU) 1(FU) 1(CU)	3.3
12. Develop an understanding by the student to be a conscientious and critical consumer of resources.	2(PU) 1(FU) 1(CU)	3.8
13. Develop a conscious future studies program for further development of technological, societal, and environmental decision making.	1(SU) 1OU) 1(PU) 1(FU)	2.5
14. Integrates other subjects and relates them to technology.	1(SU) 3(PU)	2.5
15. Assists with the child's cognitive, affective and psychomotor development.	1(PU) 1(FU) 2(CU)	4.2
16. Develop appropriate attitudes and values related to the world of work.	1(PU) 1(FU) 2(CU)	4.2
17. Develop healthy self concepts related to the world of work.	1(PU) 1(FU) 2(CU)	4.2
18. Help the students discover limitations and strengths related to the world of work.	1(PU) 2(FU) 1(CU)	4.0
19. Develop an awareness of the changing character and influence of technology on society and its culture.	1(SU) 1(PU) 1(FU) 1(CU)	3.3
20. Help students discover their own personal aptitudes.	1(OU) 1(PU) 2(CU)	3.8
21. Demonstrate (a given compliment of) technical skill in and knowledge of tools, materials, and processes.	1(SU) 1(OU) 2(PU)	2.3

These results indicate the competencies that were most frequently utilized were statement numbers 5,15,16,17, and 18. Competencies that were periodically exhibited include numbers 1,2,3,4,6,7,8,10,11,12,19, and 20. The competencies that were occasionally utilized by the teachers were numbers 9,13,14, and 21.

This chapter has disclosed the results of the study. The results of the assessment instrument have been documented. Information from the expert and competency identification, observation checklist, administration interview, and teacher questionnaire have been discussed in this chapter. Through the utilization of this research one may better understand the current status of the study of technology at the elementary school level.

CHAPTER V

Summary and Recommendations

The problem of this study was to develop a method of assessing the current status of the teaching of technology in the elementary schools of Illinois. Four schools in the east central region of Illinois were selected to participate. Feedback was provided through the research, concerning the status of the teaching about technology in the elementary schools. Several conclusions may be made from the information gathered and may be only generalizable to this study.

As technology continues to advance people should comprehend the ramifications it has upon our society. Education plays a large role in assisting the understanding of technology and to prepare people to make rational decisions regarding its implementation in the future. By exposing children at an early age about technology, they may better understand the role technology has played in the past and will play in future societies. The major emphasis at the elementary school level should then be to provide knowledge and skills necessary for a life in a technological society.

In Chapter II the literature was reviewed and a natural progression of the study of technology at the elementary school level was identified. Contemporary programs such as "A Technological Exploratorium, K-6" in Ohio, and Project Open activities at the elementary school level in West Virginia, are examples of a shift to provide learning activities for children at the primary grade level.

Eleven criteria were identified in Chapter II that were consistent with the study of technology through its historical progression. These criteria formed the basis for the teacher competencies identified by the experts and were important in the development of the assessment instrument.

Assessment Instrument

An assessment instrument was developed for this study which consisted of an observation checklist, administration interview, and a teacher questionnaire. The data collected provides a basis in which to summarize the research.

Observation Checklist: The observation checklist provided information about the daily occurrences in an elementary school classroom. Some important data was gathered through these observations.

One point worth consideration was two of the four classes had access to an Industrial Arts laboratory but they had not utilized it before. A reason for this situation included the elementary school classroom teacher had no prior training for using the facility. Another is the teacher in the Industrial Arts area has never offered to assist the classroom teacher in any activities at this level. Access to a laboratory is not essential to the study of technology but it could enhance the experience if a facility could be secured and individuals knew of activities in which to involve students.

The teaching methodologies of the teachers were all observed to

be similar. These included more teacher centered learning occurring rather than student centered happening. Few occasions were observed involving students being asked to think creatively. Lecturing was a popular means of presenting the material to the students during the observations. The experts identified teacher competencies concerning this topic and rated the opposite important. The competencies rated to be of considerable importance by the experts included: #1 Encourage the development of a technological literate person, #3 Developing student centered activities to encompass the cognitive, affective, and psychomotor domains of the child, #8 Developing problem solving skills by the student in the areas of communication, production, and transportation, #9 Utilize a method of teaching that includes practical and technical means, #14 Integrates other subjects and relates them to technology, and #21 Demonstrate (a given complement of) technical skill in and knowledge of tools, materials, and processes.

During the observations a limited number of topics were discussed concerning the study of technology. These incidences represent a limited scope concerning the study of technology. The classrooms observed did not have an established program involving the study of technology. The experts, however, felt this to be important. The teacher competencies that were rated by the experts to be of considerable importance in this area include: #1 Encourage the development of a technological literate person, #3 Establish an interdisciplinary approach to the subject matter relating to the study of communication, production, and transportation, and #14

Integrates other subjects and relates them to technology. The discussion of the study of technology is incorporated in all of the twenty-one competencies that were developed. Therefore, if the topics were being discussed in the classroom one or more of the competencies would be utilized. The schools observed did not have a program that involved the study of technology compared to the contemporary programs identified in Chapter II.

The observation checklist provided current empirical information regarding the study of technology in the elementary schools observed. This data was necessary to assess first hand the status of the teaching of technology in the sample schools. From the observations little evidence involving the existence of the study of technology in the schools of the study was found.

Administration Interview: The administration interview provided insights from the thoughts of each principal. Their responses provided recent information about the status of the study of technology in their school districts. Some commonalities of the discussions were important to the study.

One important point discussed in all four schools was the emphasis of the curriculum at the fifth grade level in the areas of reading and mathematics. This is the major thrust of education in general as perceived in our current society. The "basics" are strongly advocated by the administrators that were surveyed.

Three of the schools were also developing curriculum involving the computer. Computers were very popular in these schools and the fourth school was planning on implementing some form of computer

education to their students in the near future. All schools did have computers and children were exposed to them in various degrees. The advent of computers in the classroom is a positive step to attempt to expose the students to life in a technological society. The experts considered the development of a technological awareness of the effects of technology upon the individual, society, and the environment to be of considerable importance. The integration of the computer in the classroom may be a step in the right direction to assist in the discussion of technology at the elementary school level.

All of the administrators felt that the study of technology should be included in the curriculum content at this level. Although they were not sure where to include this subject matter. This was a positive comment by the principals about the possible future integration of the study of technology into the elementary school curriculum. The administrators did feel, however, that some of their teachers were currently discussing topics concerning the study of technology. Principals stated that teachers could involve activities related to the study of technology in their classrooms without administrative approval. These points suggest the support of the administration for the inclusion of activities involving the study of technology in the elementary school curriculum.

The four principals expressed an interest in the possibility of providing inservice activities involving the study of technology to their teachers. The administrators considered this a real possibility, providing someone approaches them concerning this topic.

They would give this topic strong consideration for inservice activities within their schools.

The administrators interviewed were not sure of what the study of technology involved. They were receptive to change, however, and would welcome meaningful inservice activities for their teachers. They also felt that their teachers were including lessons that incorporated the study of technology but were unsure to the extent. Overall, the administrators portrayed a positive attitude about the study of technology and were interested in hearing more about the topic.

Teacher Questionnaire: The questionnaire was constructed of two major sections. Information identified from the first part of the questionnaire concerned demographic data about the teacher and questions relating to their opinion of the study of technology at the elementary school level. One important point that was identified in this section was that two of the four teachers had taken courses in the areas of Industrial Arts or Technology Education as part of their college education. However, all four teachers replied they had never been exposed to the study of technology before. In addition, two teachers expressed an interest in taking graduate courses that would expose them to the study of technology. These are significant results in that they identify a lack of information exposed to the teacher while a student at the college level. This may have been over ten years ago, however, because of the information corresponding to the undergraduate degree of the prospective teachers. The information should then be incorporated in existing courses involving

level may need to be researched further in another study.

Another area of importance that was identified in the study was two of the teachers stated they would not receive the support of their administration in implementing a form of technology education in their classes. The administrators, however, unanimously stated they would support such a move. There seems to be a lack of communication on the part of both individuals. Clear lines of communication would assist in the implementation of a form of technology education at the elementary school level.

Three of the four teachers expressed an interest in inservice activities involving the study of technology. This gives an indication of the interest level of the teachers to useful information regarding the study of technology. All of the teachers also said they would be interested in receiving material and information regarding the study of technology at the elementary school level. The state of Illinois, through the Illinois State Plan, could possibly provide relevant material to the elementary school teachers concerning the study of technology.

The second section of the questionnaire asked the teachers to self evaluate their teaching about technology. A comparison may be made utilizing the competencies identified by the experts to be of considerable importance with those rated by the teachers to be most frequently utilized. These results may be seen in Table 4.

Table 4

Comparison of Expert Rated and Teacher Self Evaluated Competencies

Expert (Considerable Importance)	Teacher (Frequently Utilized)
1. Encourage the development of a technological literate person. (General Competency)	5. Encourage and support the effective use of leisure time by the student.
2. Develop student centered activities to encompass the affective, and psychomotor domains of the child.	15. Assists with the child's cognitive, affective and psychomotor development.
3. Establish an interdisciplinary approach to the subject matter relating to the study of communication, production and transportation.	16. Develop appropriate attitudes and values related to the world of work.
6. Develop a technological awareness of the effects of technology upon the individual society, and the environment.	17. Develop healthy self concepts related to the world of work.
8. Develop problem solving skills by the student in the areas of communication, production, and transportation.	18. Help the students discover limitations and strengths related to the world of work.
9. Utilize a method of teaching that includes practical and technical means.	
14. Integrates other subjects and relates them to technology.	
15. Assists with the child's cognitive, affective and psychomotor development.	
16. Develop appropriate attitudes and values related to the world of work.	
17. Develop healthy self concepts related to the world of work.	

18. Help the students discover limitations and strengths related to the world of work.

20. Help students discover their own personal aptitudes.

21. Demonstrate (a given compliment of) technical skill in and knowledge of tools, materials, and processes.

The competencies identified by the teachers to be most frequently utilized were general in nature. These included #15,16,17 and 18, #5 involved the effective use of leisure time by the student. The competencies that were more specific to the study of technology were rated low by the teachers. These were #1,2,3,6,8,9,14,20, and 21. Information provided by the questionnaire assisted in the clarification of the status of the study of technology at the elementary school level. From the questionnaire one may come to some general conclusions.

The data from the survey indicates that the teachers have limited background about the study of technology. They do, however, express an interest in the study of technology and desire to take graduate courses, attend inservice activities, and receive material and information regarding the study of technology. Teachers also feel they are providing their students with information about the study of technology but they admit they have limited knowledge of the subject matter. The questionnaire was valuable in this research to gather information from the teachers about their perceptions about the study of technology.

Recommendations

Upon the completion of this study, a number of recommendations are offered to assist in the implementation or further understanding involving the study of technology at the elementary school level. These are suggestions that may help people educate our children about the technological society in which they live.

School administrators should be better educated about the role that the study of technology may play in the curriculum of the elementary school. This may be accomplished by making presentations at local school board meetings or regional administrative workshops about the study of technology. Through the education of public school administrators, teachers may better understand the role the study of technology may play in educating the children of tomorrow.

College courses involving the study of technology should be designed. These courses should involve relevant material in which to assist the elementary school teacher in the classroom regarding the study of technology and be exposed to activities that may be utilized at the elementary school level. These teachers should understand the implications for educating young children about technology.

Inservice activities should be developed at the college and state level to better educate elementary school teachers about Technology Education. This may be done by having groups of children visit the university and experience a "Kids In Technology Day." This activity would promote the university, and the children would receive

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APPENDICIES

APPENDIX A

School of Technology EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS 61920 — 217-581-3226

February 14, 1983

This letter is to inform you that your name has been selected from the ACESIA directory to participate in a Delphi search. I am concerned with identifing people who are experts in the field of the study of technology in the elementary school. These experts should be familar with identifing competencies at the elementary school level concerned with the study of technology.

As a graduate student at Eastern Illinois University, I am writing a thesis on the development of an assessment method for the study of technology in the elementary school. I would appreciate your input in this search to identify up to ten experts in the field.

The experts will be identified by a forty member panel. Each individual of this panel should identify up to ten experts in the field. The members of the panel will then rank the experts in order from (1) representing the most qualified to (10) representing the less qualified experts. These names will be assembled and tabulated by myself and the final list will consist of the five individuals who receive the most votes. These five experts will be used for further research on the topic of investigation.

I have established a February 25, 1983 deadline for the expert search, and would like your responses at your earliest convenience. Please complete the enclosed form and feel free to call me if you have any questions. Thank you for your support and cooperation in completing this study.

Sincerely,

Peter R. McClure
Graduate Assistant

Telephone 217-581-2216

NAME:_____

SCHOOL:_____

_____

Directions: Complete the following form by identifing experts in the field of the study of technology in the elementary school. These experts should be familar with developing competencies for the study of technology at the elementary school level. Please list up to 10 experts and rank them from (1) representing the most qualified to (10) representing the less qualified individuals. After completion, please fold the form on the dotted lines that are located on the reverse side of this form. Staple the form together so that the return address is showing. Thank you for your time in completing this study.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

FOLD

FOLD

Mr. Peter R. McClure
School of Technology
Eastern Illinois University
Charleston, Illinois 61920

Delphi Survey List

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School of Industrial Education and Engineering Technology
Trenton State College
Trenton, New Jersey 08625

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Marion, North Carolina 28752

Ms. Mary-Margaret Scobey
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Walnut Creek, California 94595

Dr. Keith Blankenbaker
The Ohio State University
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Columbus, Ohio 43210

Ms. Norma Heasley
Summit County Board of Education
482 Grant St.
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Dr. Arthur Deane
Dept. of Industrial & Vocational Education
The University of Alberta
Edmonton, Alberta, Canada

Dr. Kendall Starkweather
Executive Director, AIAA
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Dr. Robert Nannay
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Dr. Michael Williams
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APPENDIX B

School of Technology
EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS 61920 — 217-581-3226

March 24, 1983

This letter is to inform you that your name has been identified, through a delphi search, as an expert in the study of technology at the elementary school level. I am concerned with identifing specific teacher objectives that reflect the study of technology in the elementary school. These objectives should represent specific teacher goals for the study of technology at the fifth grade level.

As a graduate student at Eastern Illinois University, I am writing a thesis on the development of an assessment method to identify the study of technology in the elementary school. I would appreciate your input in this search to identify specific teacher objectives involved in the study of technology at the elementary school level.

These objectives will be selected by a seven member panel. Each individual of the panel should identify specific teacher objectives or goals for a fifth grade class. The members of the panel should add objectives to the initial list if they feel the objectives are appropriate. The individuals of the panel should rate the objectives according to the scale provided. The scale rates the importance of the objectives. Two rounds of the delphi will be utilized to establish a list of objectives for the study of technology at the fifth grade level.

I have established an April 8, 1983 deadline for the initial teacher objective search and would appreciate your responses at your earliest convenience. Please complete the enclosed form and make additional suggestions for teacher criteria if appropriate. Thank you for your support and cooperation in completing this study.

Sincerely,

Peter R. McClure
Graduate Assistant
Eastern Illinois University

Directions: The scale on this page is designed to assist you in assigning a numerical value to the items on the enclosed form.

VALIDITY SCALE

Numerical Scale	
1	**No Importance** Competency not needed. Not required.
2	**Little Importance** Of little value. Other competencies of greater value.
3	**Moderate Importance** Desirable to acquire.
4	**Considerable Importance** Of great value to teach the study of technology.
5	**Great Importance** Essential to acquire. Vital to the study of technology.

This form adapted from the National Material Advisory Board. A Delphi Exploration of the U.S. Ferroalloy and Steel Industries. Springfield, VA: National Technical Information Service, 1971.

Elementary School Technology Education Teacher Competency Statements

Directions: Please rate each of the statements by placing a circle around the number that best represents your opinion of the item's importance to the teaching of technology in the fifth grade of the elementary school.

No Importance = NI = 1
Little Importance = LI = 2
Moderate Importance = MI = 3
Considerable Importance = CI = 4
Great Importance = GI = 5

	NI	LI	MI	CI	GI
	1	2	3	4	5
1. Encourage the development of a technological literate person.	1	2	3	4	5
2. Develop student centered activities to encompass the cognitive, affective, and psychomotor domains of the child living in a technological society.	1	2	3	4	5
3. Utilize a systems design to curriculum and relate an interdisciplinary approach to the subject matter in relationship to the study of communication, production, and transportation.	1	2	3	4	5
4. Assist in developing useful technical consumer skills by the student.	1	2	3	4	5
5. Encourage and support the effective use of leisure time in a technological society.	1	2	3	4	5
6. Develop a technological awareness of the effects of technology upon the individual society, and the environment.	1	2	3	4	5
7. Exhibit a flexability to adapt to change in curriculum content.	1	2	3	4	5
8. Attempt to develop problem solving skills by the students in the areas of communication, production, and transportation systems.	1	2	3	4	5
9. Utilize a method of teaching that includes practical and technical means, such as a "minds on hands on" approach.	1	2	3	4	5

10. Encourage the development of creativity through design and self expression in the areas of communication, production, and transportation systems.	1	2	3	4	5

Please add your suggested competencies below.

11. _____	1	2	3	4	5
12. _____	1	2	3	4	5
13. _____	1	2	3	4	5
14. _____	1	2	3	4	5
15. _____	1	2	3	4	5
16. _____	1	2	3	4	5
17. _____	1	2	3	4	5
18. _____	1	2	3	4	5
19. _____	1	2	3	4	5
20. _____	1	2	3	4	5

School of Technology
EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS 61920 — 217-581-3226

April 29, 1983

This letter is the final correspondence concerning the identification of teacher competencies regarding the study of technology at the elementary school level. The initial list of competencies and the additional expert identified competencies are enclosed. It is essential to my research that the enclosed forms be completed as soon as possible. The list of criteria should be addressed in its' entirety.

I have set a May 10, 1983 deadline for the return of these surveys. You have been a tremendous help in the identification of the criteria and I will provide you with the results of my research upon its' completion. Thank you again for your assistance in swiftly completing this survey.

Sincerely,

Peter R. McClure
Graduate Assistant

Telephone 217-581-2216

enc

Elementary School Technology Education Teacher Competency Statements

Directions: Please rate each of the statements by placing a circle around the number that best represents your opinion of the item's importance to the teaching of technology in the fifth grade of the elementary school.

No Importance = NI = 1
Little Importance = LI = 2
Moderate Importance = MI = 3
Considerable Importance = CI = 4
Great Importance = GI = 5

	NI	LI	MI	CI	GI
	1	2	3	4	5
1. Encourage the development of a technological literate person. (General Competency)	1	2	3	4	5
2. Develop student centered activities to encompass the cognitive, affective, and psychomotor domains of the child.	1	2	3	4	5
3. Establish an interdisciplinary approach to the subject matter relating to the study of communication production, and transportation.	1	2	3	4	5
4. Develop technical consumer skills by the student.	1	2	3	4	5
5. Encourage and support the effective use of leisure time by the student.	1	2	3	4	5
6. Develop a technological awareness of the effects of technology upon the individual society, and the environment.	1	2	3	4	5
7. Exhibit a flexability to adapt to change in curriculum content.	1	2	3	4	5
8. Develop problem solving skills by the student in the areas of communication, production, and transportation.	1	2	3	4	5
9. Utilize a method of teaching that includes practical and technical means.	1	2	3	4	5
10. Encourage the development of creativity through design and self expression in the areas of communication, production, and transportation systems.	1	2	3	4	5

11. Develop skills and understanding of research and development through individual investigation.	1	2	3	4	5
12. Develop an understanding by the student to be a conscientious and critical consumer of resources.	1	2	3	4	5
13. Develop a conscious future studies program for further development of technological, societal, and environmental decision making.	1	2	3	4	5
14. Integrates other subjects and relates them to technology.	1	2	3	4	5
15. Assists with the child's cognitive, affective and psychomotor development.	1	2	3	4	5
16. Develop appropriate attitudes and values related to the world of work.	1	2	3	4	5
17. Develop healthy self concepts related to the world of work.	1	2	3	4	5
18. Help the students discover limitations and strengths related to the world of work.	1	2	3	4	5
19. Develop an awareness of the changing character and influence of technology on society and its culture.	1	2	3	4	5
20. Help students discover their own personal aptitudes.	1	2	3	4	5
21. Demonstrate (a given compliment of) technical skill in and knowledge of tools, materials, and processes.	1	2	3	4	5

APPENDIX C

OBSERVATION CHECKLIST

Grade:_____
Location:_____
Number of Visitations:_____
Length of Time:_____

1. Classroom organization.
   A.Formal B.Informal

Comments:

2. Number of students in the class.
   Number of males:_____
   Number of females:_____

Comments:

3. Classroom facility.
   A. Lighting:_____
   B. Desks:_____
   C. Location within facility:_____
   D. Dimensions:_____
   E. Reference facility:_____

Comments:

4. Teacher evaluation.
   A. Enthusiasm for subject matter:_____
   B. Method of instruction:_____
   C. Student opinion of teacher:_____

Comments:

5. Texts and aids utilized.
   A. Current texts used:_____
   B. Use of visuals in teaching:_____

Comments:

6. Discussion of topics relating to the study of technology.

Comments:

7. Subject areas observed being discussed.

Comments:

APPENDIX D

ADMINISTRATION INTERVIEW

School:_____

Administrator:_____

1. What is the major emphasis of your curriculum for the fifth grade in your school district ? (Objectives or Competencies).

2. Have you ever heard of the study of technology at the elementary school level ? If so, do you feel that it should be included as part of the elementary school curriculum in your area ?

3. Does the classroom teacher have the option to include various activities associated with the study of technology without your approval ? If so, what kind of support would the teacher receive from the administration ?

4. What kind of special facilities does your school district have to assist the classroom teacher in implementing the study of technology at the elementary school level ?

5. Has or would the school district provide inservice activities that could help teachers include activities involving the study of technology in their classrooms. ?

6. Does your district give credit on a salary scale or reimburse teachers for continuing their education ? Please explain.

SYNOPSIS Of INTERVIEW

School: D

Answer To Question #1.

The emphasis in the curriculum content is in the areas of reading and mathematics. These areas are the basics for all levels. Minimum competencies were not utilized but they are popular in many other states. The school has recently purchased a number of computers and over the past two years have attempted to educate the students to become computer literate.

Answer To Question #2.

The administrator is unsure of the exact content area of the study study of technology. He does feel however that some of the material is covered in the science classes. Industrial Arts courses are offered for the students beginning in the junior high school.

Answer To Question #3.

The teachers could incorporate activities involving the study of technology in their classrooms without his approval. The principal added that it would please to see teachers take an initiative to develop new activities.

Answer To Question #4.

This particular classroom was in a building that also housed the junior high school. Industrial Arts courses were offered at the junior high school level but the facility had never been utilized for the elementary school students. The use of a computer lab was also mentioned.

Answer To Question #5.

The administration was receptive to the possibility of providing inservice activities involving the study of technology. Nothing had ever been done in this content area before and the principal was very positive.

Answer To Question #6.

This school district advanced the teacher on a salary scale for taking graduate level courses. No reimbursement was given to cover the tuition cost.

SYNOPSIS OF INTERVIEW

School: X

Answer To Question #1.

The major emphasis of this school was to prepare the student for the next level of reading and mathematics. Computers were just being introduced on a large scale at the elementary school level. He stated the advent of computers upon curriculum could have a large impact. No minimum competency testing is performed in his district but it is very popular in other states. The test that is utilized is the Iowa Achievement Test.

Answer To Question #2.

The principal feels this material is discussed in social studies class. Industrial Arts activities were offered in the junior high and high school.

Answer To Question #3.

The administration is receptive to allowing teachers to develop new activities on their own. It should not take the place of existing course content. Teachers would also receive the support of the administration to integrate activities involving the study of technology.

Answer To Question #4.

The fifth grade elementary classroom is located near an Industrial Arts lab in the building. Activities have not taken place in the past because of the safty factor of the small children being in the lab. A computer lab is being utilized in various areas of the curriculum.

Answer To Question #5.

The principal is interested in learning more about the study of technology. He is very positive about securing activities in this content area for his teachers. Activities in this subject area have not been explored before.

Answer To Question #6.

The teachers are advanced on a salary scale and are not reimbursed for the cost of tuition for taking a graduate course.

SYNOPSIS OF INTERVIEW

School: G

Answer To Question #1.

Reading and mathematics are the areas of emphasis in this schooldistrict. Competency testing is not performed in Illinois. Computer literacy was also a major concern of this administrator. He spoke of possible skills to be mastered on the computer at the completion of each grade level.

Answer To Question #2.

The principal is not quite sure what the study of technology involves. He feels however the discussion in this area is demonstrated in the science classes. He mentioned that Industrial Arts courses were not offered at the elementary school level but did take place at the junior high school level. Computers were discussed as a possible answer to this question.

Answer To Question #3.

Activities involving the study of technology could be incorporated by the teacher without the administrator's approval. The administrator would also support the integration of these activities into the curriculum. These activities should not be substituted for other subject areas.

Answer To Question #4.

There are no formal facilities available for Industrial Arts activities at the elementary school level. Courses are offered in this area at the junior high school level. Computer assisted learning and programing are on the increase in this school district. This school has an equipped computer lab.

Answer To Question #5.

No inservice activities in this area have ever been attempted but the principal is receptive to there inclusion. These activities should be useful and involve activities that would be useful to the teacher.

Answer To Question #6.

No reimbursement for tuition is provided by the school but the teachers are advanced on a salary scale for taking graduate course work.

SYNOPSIS OF INTERVIEW

School: Z

Answer To Question #1.

The emphasis was placed on all areas of study in this school but reading and mathematics were common subjects incorporated in all areas and these were stressed the most. Use of the computer and a shift toward computer literacy were also emphasized. Minimum competencies were not utilized in the school but they have been researching this topic in the school district. Specific tests have not been developed to date. The tests that are utilized are the Iowa Achievement.

Answer To Question #2.

This principal was familar with the term but was unsure of its exact meaning. He felt that it should be included in the curriculum of the elementary school however. Some teachers stressed this area more than others. He stated that most of the material in this area may be covered in the science class. Industrial Arts was not offered at the elementary school level in this school.

Answer To Question #3.

Activities involving the study of technology could be utilized by the teacher without administrative approval. The principal felt that if the teachers were doing something different in the classroom, they would notify him anyway. The administration would support the teacher if the material was relevant to the subject matter.

Answer To Question #4.

No special facilities were located in the school to assist in the teaching of technology. There was a computer center that the students had access to.

Answer To Question #5.

Nothing had ever been done involving inservice activities related to the study of technology. The principal was receptive to inservice activities in this area for future implementation.

Answer To Question #6.

In this school district, a tuition waver and increases on the pay scale were provided for the teacher for taking graduate level courses.

APPENDIX E

Teacher Questionnaire

Please complete the following questionnaire, concerning the study of technology at the elementary school level. Circle the most appropriate answer for your teaching situation.

1. What degree in the field of education have you attained ?

A. Certificate
B. Bachelor of Science or Arts
C. Master of Science or Arts
D. Doctorate in education

2. How many Industrial Arts or Technology Education courses did you take while you were in college ?

A. 0
B. 1-2
C. 3-5
D. More than 5

3. What is your yearly classroom budget for supplies ?

A. 0
B. 0-$50.00
C. $50.00- $100.00
D. $100.00- or more

4. Have you taken a graduate course in the field of education within the last 2 years ?

A. Yes
B. No

5. Have you ever been introduced to the study of technology at the elementary school level ?

A. Yes
B. No

6. Would you be interested in taking graduate courses that would expose you to the study of technology at the elementary school level ?

A. Yes
B. No

7. If you expressed an interest in implementing a form of technology education in your classroom, would you receive the support of your administration ?

A. Yes
B. No

8. Would you be interested in an inservice activity that would show the benefit of implementing the study of technology at the elementary school level ?

A. Yes
B. No

9. At this time, do you feel you are integrating the study of technology in your presentations to the students ?

A. Yes
B. No

10. What is your current age ?

A. 20-30
B. 30-40
C. 40-50
D. 50-60
E. 60- and above

11. If the state board of education offered to provide you, the classroom teacher, with material and information regarding the study of technology at the elementary school level, would you utilize this material in your teaching ?

A. Yes
B. No

Elementary School Technology Education Teacher Competency Statements

Directions: Please read each of the following teacher competency statements and objectives. Rate these statements according to their occurence in your fifth grade classroom.

Seldom Utilized = SU = 1
Occasionally Utilized = OU = 2
Periodically Utilized = PU = 3
Frequently Utilized = FU = 4
Consistantly Utilized = CU = 5

	SU	OU	PU	FU	CU
	1	2	3	4	5
1. Encourage the development of a technological literate person. (General Competency)	1	2	3	4	5
2. Develop student centered activities to encompass the cognitive, affective, and psychomotor domains of the child.	1	2	3	4	5
3. Establish an interdisciplinary approach to the subject matter relating to the study of communication production, and transportation.	1	2	3	4	5
4. Develop technical consumer skills by the student.	1	2	3	4	5
5. Encourage and support the effective use of leisure time by the student.	1	2	3	4	5
6. Develop a technological awareness of the effects of technology upon the individual society, and the environment.	1	2	3	4	5
7. Exhibit a flexibility to adapt to change in curriculum content.	1	2	3	4	5
8. Develop problem solving skills by the student in the areas of communication, production, and transportation.	1	2	3	4	5
9. Utilize a method of teaching that includes practical and technical means.	1	2	3	4	5
10. Encourage the development of creativity through design and self expression in the areas of communication, production, and transportation systems.	1	2	3	4	5

11. Develop skills and understanding of research and development through individual investigation.	1	2	3	4	5
12. Develop an understanding by the student to be a conscientious and critical consumer of resources.	1	2	3	4	5
13. Develop a conscious future studies program for further development of technological, societal, and environmental decision making.	1	2	3	4	5
14. Integrates other subjects and relates them to technology.	1	2	3	4	5
15. Assists with the child's cognitive, affective and psychomotor development.	1	2	3	4	5
16. Develop appropriate attitudes and values related to the world of work.	1	2	3	4	5
17. Develop healthy self concepts related to the world of work.	1	2	3	4	5
18. Help the students discover limitations and strengths related to the world of work.	1	2	3	4	5
19. Develop an awareness of the changing character and influence of technology on society and its culture.	1	2	3	4	5
20. Help students discover their own personal aptitudes.	1	2	3	4	5
21. Demonstrate (a given compliment of) technical skill in and knowledge of tools, materials, and processes.	1	2	3	4	5

ABSTRACT

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This study was designed to gather empirical data regarding the study of technology in the elementary school. For this research the fifth grade level was explored in four elementary schools located in east central Illinois. The problem of the study was to develop a method of assessing the current status of the teaching of technology in the elementary schools of Illinois.

A literature review was conducted to gather information concerning the historical development of the study of technology at the elementary school level. With the information uncovered in the literature review, some common criteria were developed to identify the study of technology in the elementary school. These criteria were then formulated into teacher competencies.

A delphi search was conducted to identify experts in the area of the study of technology at the elementary school level. Once identified, the seven experts were asked to rate the initial teacher competencies and add additional competencies to the list if they deemed it appropriate. The experts evaluated the competencies through two rounds of investigation.

An observation checklist was developed as part of an assessment instrument to assist in the recognition of the teaching about technology in the elementary schools. A total of six hours observation time was compiled over two separate visitations to the schools involved in the study.

The teacher competencies developed from the delphi study were

later incorporated into one part of a two part teacher questionnaire. The first section ofOthe questionnaire asked the teacher to respond to questions concerning demographic data and their perceptions about the study of technology. The second section of the questionnaire utilized the teacher competencies developed by the experts in this study. This part of the questionnaire asked the teachers to perform a self evaluation of their teaching of technology utilizing the competencies specified. The questionnaire was another part of the assessment instrument developed fos this study.

To gain knowledge about another area of the study of technology at the elementary school level, interviews were conducted with the principals of the schools involved in the study. The interview consisted of technology in their school districts. Other questions covered the topics of inservice and activities and flexibility of the teacher to incorporate activities involving the study of technology. The administrator interview comprised the third section of the assessment instrument developed for this study.

The data was collected and an analysis was conducted to portray the current status of the study of technology at the elementary level for the schools involved in the study. A summary of the data showed that the elementary school teachers involved in the study were unaware of activities that encompassed the study of technology. The teachers and administrators were receptive to learning more about this content area. Teachers also felt they were involving some of the content about technology into their teaching.

Recommendations were also docueented to assist in the future

implementation of the study of technology for schools of east central Illinois. Some of these recommendations included better educating the administrators in the area about the study of technology. This could be accomplished by presenting information at regional administration workshops. Another thought would be to better design college courses for elementary school teachers to provide them with activities to represent the technological world in which we live. Inservice activities should be undertaken to educate the teachers around the area about the benefits of involving the study of technology in their presentations to students. The Illinois State Plan should develop activities for this level that are short in length, should be well tested, and specifically designed for the teacher who is unfamiliar with this content area.

This study provides a base in which to explore further in this subject area. It was intended to provide exploratory information about the study of technology at the elementary school level and its identification.

APPROVAL PAGE

APPROVAL PAGE

AN ASSESSMENT OF THE TEACHING OF TECHNOLOGY IN ELEMENTARY SCHOOLS OF EAST CENTRAL ILLINOIS

Peter R. McClure

Eastern Illinois University

We the undersigned give approval of this document.

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