THE IDENTIFICATION OF PROBLEMS IN IMPLEMENTING METRICS IN OKLAHOMA'S AREA VOCATIONAL-TECHNICAL SCHOOLS

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TECHNICAL SCHOOLS

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CHAPTER I

INTRODUCTION

On December 23, 1975, President Ford signed the Metric Conversion Act into law. This law committed the United States to a program of predominant, but not exclusive use of the metric measurement system (1).

The metric system was first adopted in the United States in 1866, but it was used sparingly. In 1885, the United States defined the pound and yard as decimal portions of their metric equivalents. This was the country's first step in accepting a universal standard of measurement. In 1971, the Secretary of Commerce recommended that the United States change to predominant use of the metric system. This recommendation led to the recent adoption of the Metric Conversion Act (2).

Many American school systems are moving toward adoption of the metric system. In California, all elementary texts now include metrics (3). Metrics are taught on a regular basis throughout the Houston school system. The North Carolina State Board of Education has ordered that all measurement instruction be in metrics by 1981, with the English system taught only in historical context (4).

It is no longer a question of "Is the United States going metric?" but rather when. Recent developments in business, industry, and government are moving the United States into becoming a metric measuring nation. The use of the metric system is appearing in the production of trade and consumer goods. We can expect that many vocational classes

will be using the metric system in the future.

Statement of the Problem

The United States is currently in a transition period from the customary measurement system to a metric measurement system. Federal legislation now calls for our conversion to the predominant use of the metric system by 1985.

In responding to the Metric Conversion Act educators are faced with the question, "Where do we start?". What to do, how to do it, and when to do it, are problems that need to be solved to insure an effective and orderly transition to the metric system.

Specifically, the problem this study dealt with was the lack of information regarding area vocational-technical school administrators' assessment of the anticipated problems they expect to encounter in implementing the metric measurement system as the predominant measurement in the curriculum of their schools.

In implementing metrics as the predominant measurement system in area vocational-technical schools in Oklahoma it is essential that the problems to be encountered by administrators be identified.

Need for the Study

The State Department of Vocational and Technical Education of Oklahoma has recognized the need to develop a systematic program for the adoption of the metric system in its educational programs. The formation of the "Coordinating Committee for Implementing Metrics" was the first step in meeting this need. The committee created a timetable that called for the predominant use of the metric system in

vocational education by September, 1980 (5, p. 2).

There were no guidelines available to administrators of area vocational-technical schools to assist them in implementing metrics. The guidelines developed in this study were intended for use by vocational-technical school administrators in implementing metrics as the predominant measurement system in the curriculums of area vocational-technical schools in Oklahoma.

Purpose of the Study

The purpose of this study was to identify problems as perceived by the head area vocational-technical school administrators in implementing metrics as the predominant measurement system in the curriculums of area vocational-technical schools in Oklahoma, and to develop recommendations for solving the identified problems.

Objectives of the Study

The long-range goal of this study is to provide head area vocational-technical school administrators in Oklahoma with guidelines for implementing metrics as the predominant measurement system in area vocational-technical schools in Oklahoma. The investigator believed a systematic approach was necessary to insure the successful implementation of metrics. The framework for the procedures used in this study was developed from the following objectives:

1. To identify problems perceived by Oklahoma area vocational-technical school head administrators in introducing metric measurement as the predominant measurement system in their schools;

2. To rank the perceived problems by significance as determined by their frequency of occurrence and importance; and
3. To develop a set of recommendations to solve the perceived problems.

Definitions

Metrics--the international system of units defined by the International Congress of Weights and Measures in 1960.

Perceived Problems--the problems that are identified by head area vocational-technical school administrators in Oklahoma as those problems which will result from attempting to implement metrics as the predominant measurement system in the curriculums of area vocational-technical schools in Oklahoma.

CHAPTER II

REVIEW OF THE LITERATURE

History of Measurement Systems

> Weights and measures may be ranked among the necessaries of life to every individual of human society. They enter into the economical arrangements and daily concerns of every family. They are necessary to every occupation of human industry; to the distribution and security of every species of property; to every transaction of trade and commerce; to the labors of the husbandman; to the ingenuity of the artificer; to the studies of the philosopher; to the researches of the antiquarian, to the navigation of the mariner, and the marches of the soldier; to all the exchanges of peace, and all the operations of war. The knowledge of them, as in established use, is among the first elements of education, and is often learned by those who learn nothing else, not even to read or write. This knowledge is riveted in the memory by the habitual application of it to the employments of men throughout life (6).

Among the first tools invented by man were weights and measures. These primitive tools were used by man for bartering food, fashioning clothing and constructing shelters. Naturally, man turned to his immediate surroundings when defining these tools. Early man's measurements were based on such variable standards as the length of his arm or the weight of seeds or stones. As civilization evolved, his need for a precise measuring system increased. Commerce, land division, and taxation demanded a more complex measurement system. The limited international exchange of goods and ideas led to the establishment of different measuring systems in different parts of the world (7).

The measurement system used in the United States was brought here

by the colonists. This English or Customary system was the result of many cultures, and had evolved from various sources. This resulted in an accurate, but confusing measurement system (7).

In 1790, in an attempt to standardize measurement, the French Government commissioned the Academy of Sciences to develop a measurement system, based on ten, with related units. The result was the development of the metric system (8).

Thomas Jefferson recommended that the United States adopt the metric system in 1790. In 1971, a committee of the United States Senate proposed that the best policy for this country was to remain with the present system (8). The United States made the metric system legal, but not mandatory, in 1866, and defined the pound and yard as a decimal portion of the kilogram and meter in 1893. The United States has maintained interest in the metric system ever since. The Metric Study Act of 1968 authorized a three-year study that concluded that the United States should change to a predominant use of the metric system through a coordinated national program (9). The Metric Conversion Act of 1975 encourages conversion to the predominant use of the metric system in ten years (1).

The impact of this legislation will be as great as if the law had created a mandatory timetable for conversion. The United States Office of Education is helping the nation's schools to adopt metrics with several programs. Thirty states have already formulated plans for teaching metrics. Several leading manufacturers such as General Motors, Ford, and IBM are beginning to produce products using the metric measurement system (10).

> The United States has no such excuse to offer for her hesitation in joining the majority of civilized nations of the world in adoption of the metrical system. We already have a decimal system of money, and our people are therefore prepared to appreciate the great saving of labor involved in pushing the decimal principal into all our methods of measurement. We would not, if we could, go back to the old pounds, shillings, and pence of our ancestors, for we can realize through our every-day experience with dollars and cents the drudgery we are saved in all financial calculations, and are therefore prepared to appreciate, by analogy, that corresponding benefits would arise from our adoption of a decimal system in our weights and measures (11).

Results of Previous Research

The conversion to metrics has raised concerns in many educators. These concerns range from teacher attitudes and public support, to the formation of procedures that can contribute to a systematic transition.

In assessing the attitudes of vocational and technical teachers, Headrick's findings concluded that an overall markedly favorable attitude existed toward metrication. He concluded that the teacher's metric knowledge was the most important factor in the teacher's positive attitude toward metrics. He stated that the vocational-technical teachers did not agree with every aspect of metrication, but their overall favorable attitude was an asset in dealing with the metric question (12).

A survey of vocational-technical teachers conducted by the New York State Education Department established that teachers felt a need for guidelines for metric implementation and metric workshops for teachers. The teachers further indicated that (13):

1. A majority of teachers attempt to stimulate metric awareness.
2. The primary source of influence to stimulate student understanding of metrics came from professional organizations.
3. There is a need to emphasize metrics in their subject area

Szabo (14) identified eight major categories of concern regarding the implementation of the metric system. These eight areas were: national planning, state planning, budget needs, curriculum development for pupils, inservice training for teachers, exemplary programs, legislation, and anticipated needs. In attempting to clarify actions needed to solve these concerns he surveyed the State Departments of Education of all fifty states and four territories. As a result of the survey, he concluded that:

1. Planning for metrication should be comprehensive and carefully coordinated at the state and national level.
2. A firm national-state commitment should consist of supporting legislation and appropriation measures, including establishment of a definite target date for full conversion to the metric system.
3. State Departments of Education should be prepared to provide school districts with curriculum guidelines, materials for students, and inservice teacher education.
4. State Departments of Education should anticipate needed budget and other resources to obtain consultant help, and support curriculum development services and other requirements needed to carry out a statewide metrication program.

Szabo (14) concluded his study by recommending:

1. Metric goals and objectives be defined;
2. The establishing of communication structures to coordinate the development of metric programs;
3. The development of metrics consultants; and
4. The establishment of broad federal guidelines.

A study involving Nevada teachers supports the need for concise implementation guidelines. Trent's (15) investigation also discovered that a large majority of teachers value metric workshops and would attend them.

The final report from the Interstate Consortium on Metric Education (16) listed 23 recommendations related to the adoption of the metric system. Many of these recommendations pertained to adoption of specific standards and the interdisciplinary approach that should be used. The report also noted the need to develop criteria for the selection of instructional materials and inservice teacher training programs. The report stated that public acceptance of metrics is of critical importance, and that all agencies should develop metric awareness activities.

George Washington University (17) reviewed the findings of two projects, funded by the American Institute of Research, that dealt with the impact of metric conversion in other countries. This report identified the three vital needs to insure a successful conversion policy. These vital needs included involvement of all major elements in planning, a committed government policy and firm schedules, and communication and coordination as conversion progresses. The recommendation of this report were:

1. The need for a national evaluative body to establish standards for metric material; and
2. A coordinated teacher training program.

Methodology of Previous Research

Researchers have used many methods in attempting to answer the

metric question. Trent's (15) survey determined the extent of formal training vocational-technical teachers had in the metric system and their attitudes and perceptions regarding its implementation. The same questionnaire-type method was used in New York State to determine metric awareness among teachers and the use of the metric system in their classes (13). These surveys proved effective in documenting the extent of teacher metric activity.

In compiling major concerns regarding metrics implementation, Szabo (14) reviewed the literature. The results of this review were then used to formulate a survey that ultimately concluded with recommendations concerning metrics.

The recommendations of the International Consortium on Metrics Education (16) were produced by committees. These committees were staffed by the representatives of each of the 28 states involved. These members were selected because they were responsible for metric implementation in their state.

The Oklahoma State Department of Vocational and Technical Education used the Delphi Technique in determining the future role of vocational and technical education (18). This process, of gaining opinions of knowledgeable people, proved valuable in planning for the department.

In Madrid's (19) investigation of administrative problems in New Mexico, she also relied upon the Delphi Technique. After identifying the administrative problems by that process, she sought to develop guidelines to solve those problems. A committee, of the Delphi participants and selected individuals, was used to propose possible solutions, and by consensus, arrived at implementation guidelines. This process of combining the Delphi Technique and committee activity proved

successful in that study.

Delphi Technique

> This is a new epistemological approach to the inexact sciences. The purpose of all science is to explain and predict in an objective manner. While in the exact sciences explanation and prediction have the same logical structure, this is not so in the inexact sciences. This permits various methodological innovations in the inexact sciences, e.g., expert judgment and simulation (20, p. 25).

The Delphi Technique was used to collect the data for this study. The Delphi Technique was designed to obtain a group response without face-to-face interaction of the participants. It uses the questionnaire method to obtain the responses. These opinions are organized and shaped by the use of feedback. This method was developed by scientists at the Rand Corporation for long-range forecasting (21). The Delphi Technique has been widely accepted by industry and is considered one of the best speculative techniques to foresee future trends (22).

In the past, tradition has played a large part in our methods of obtaining consensus on group opinion. The round table discussion usually results in a final position that is a compromise for all parties. This compromise is often derived under the influence of psychological factors such as the persuasion of a supposed authority, the bandwagon affect of majority opinion, or even the loudest voice (23). The effects of the traditional methods of obtaining group opinions are countered by the Delphi Technique.

The Delphi Technique is a mailed survey that involves getting reactions to specific statements, combining these reactions and again asking the individuals to review and rank the findings until a priority

ranking is achieved (19). The procedure is followed without the participants ever meeting as a group.

The Delphi Technique includes: A panel of selected individuals, knowledgeable about the problem, is formed. Each participant is asked to respond to the stated problem. The participants receive feedback in the form of a composite list of problems, often nothing more than a frequency rating for each item. The participants are then asked to rank each item according to its degree of importance. The responses are compiled into a list again. This step can be repeated several times. The final step is formalizing the report from the consensus arrived at by repeating questioning (21).

Dalkey (24) noted the success of using the Delphi Technique when reporting the results of an experimental study conducted by the Rand Corporation. His findings can be summarized as:

1. A wide range of individual answers appear on the first round.
2. With each succeeding round the distribution of individual responses narrows or converges.
3. Generally the group response becomes more accurate.

Summary

The United States adoption of the metric system is steadily progressing. Within the next decade weights and measures in this country will be conducted predominantly in the metric system. Business, industry and education are faced with the problem of developing procedures that will enable them to cope with this transition. Many elements in our society are beginning to address the metric problem, but to insure the systematic adoption of metrics, there is much work left to be done.

Many educational agencies are devoting time and effort to metric implementation. A review of the literature provided us with problems and areas of concern that must be investigated. The underlying theme of these studies is that metric conversion must be coupled with comprehensive planning of the conversion process.

This researcher believes that implementation guidelines are essential for successful metrics implementation in Oklahoma's area vocational-technical schools. A procedure that identified metric transition problems, and created specific implementation guidelines was essential. The use of the Delphi Technique for problem identification and development of guidelines as recommendations proved well suited for the study.

CHAPTER III

METHODOLOGY

The purpose of this study is to identify problems, as perceived by the head area vocational-technical school administrators, in implementing metrics as the predominant measurement system in the curriculums of area vocational-technical schools in Oklahoma, and to develop recommendations for solving the identified problems.

Objectives of the Study

The study had the following three specific objectives:

1. To identify problems perceived by head Oklahoma area vocational-technical school administrators in introducing metric measurement as the predominant measurement system in their schools;
2. To rank the perceived problems by significance as determined by their frequency of occurrence and importance; and
3. To develop a set of recommendations to solve the perceived problems.

Subjects of the Study

The subjects for this study consisted of all head area vocational-technical school administrators in Oklahoma (Appendix D). The 21 administrators were contacted in each phase of the study, with 20

responding to one or all of the correspondence sheets. The remaining administrator was contacted by phone during the second follow-up to the first correspondence. When contacted he indicated that he did not have time to participate in the study. Subsequent correspondence sheets were sent to the non-responding administrator, permitting him to participate if he desired.

Many groups or combination of groups could have been selected as the population or sample for the study. It was the researcher's contention that head administrators were in the best position to identify problems that would affect the area vocational-technical school as a whole, rather than problems that would affect individual programs. The researcher further believed the head administrators were the most capable school agent to recommend solutions to those problems that would be practical for their situation.

Procedure of the Study

A modified Delphi Technique was used to gather data for the study. To meet the objectives of the study three phases were conducted. These phases were:

1. Correspondence Sheet No. 1--identified problems perceived by head Oklahoma area vocational-technical school administrators in introducing metric measurement as the predominant measurement system in their schools.
2. Correspondence Sheet No. 2--ranked the perceived problems by significance as determined by their frequency of occurrence and importance.
3. Correspondence Sheet No. 3--designed to rearrange the ranking

established by Correspondence Sheet No. 2. The ranking was not changed from that established in Correspondence Sheet No. 2.

4. Correspondence Sheet No. 4--developed a set of recommendations to solve the perceived problems.

Correspondence Sheet No. 1

Correspondence Sheet No. 1 (Appendix A) was an open-ended question posed to the head administrators. The administrators were asked to list endings in no particular order of importance to the statement, "As the head administrator for an area vocational-technical school in Oklahoma, I perceive the following problems in implementing metrics as the predominant measurement system in the curriculum of my school as being:". Correspondence Sheet No. 1 contained ten numbered response spaces, but no specific number of responses was required from the respondents. Also included in the same letter was a cover letter (Appendix A) introducing the researcher and an explanation of the proposed phases of the study (Appendix A) and a self-addressed, stamped envelope. The head administrators submitted 110 responses to that question. The researcher, in conjunction with his graduate committee, synthesized these statements into 24 perceived problems.

Correspondence Sheet No. 2

Correspondence Sheet No. 2 (Appendix B) contained the 24 perceived problems listed in no particular order identified in the previous communication. A cover letter (Appendix B) also accompanied Correspondence Sheet No. 2. For each of the perceived problems the head

administrators were asked to respond twice. The first response was to indicate how frequently they anticipated the problem would occur on a five-point scale. The scale was 1 - very seldom, 2 - seldom, 3 - sometimes, 4 - often, and 5 - very often. The second response was an indication of how important the problem was when it did occur, rated on a five-point scale. The scale was 1 - no importance, 2 - slight importance, 3 - some importance, 4 - quite important, and 5 - extremely important. The rank of each problem was determined by multiplying response one, frequency, times response two, importance. The mean responses of the factors for each item determined the ranking of the items. If an individual problem was ranked 2, or seldom, for frequency of occurrence and 4, or quite important, for importance, its significance of frequency of occurrence and importance would be 2 X 4 or 8.

In assessing, understanding and describing many situations more than one factor comes into play. Economists have long used index numbers to allow them to achieve a realistic impression of the price of commodities bought at different times (25). This same principle is used in conducting a task analysis.

> A related problem is the need to identify tasks that, although performed infrequently, are highly critical. Tasks to be performed in emergency situations are examples (Remove injured personnel, direct evacuation of building, administer mouth-to-mouth resuscitation, etc.). Since they are performed infrequently and are tangential to the worker's main tasks, there's a good chance they will never become candidates for training unless some provision is made to identify them (26, p. 16).

In generating planning goals for the State of Idaho a Delphi Technique that used two independent questions for each response item proved very successful (27). In identifying the head administrators' ranking

of the perceived problems, it is essential that consideration be given to both frequency of occurrence and importance. This is necessary to put problems that seldom appear but are extremely important and problems that appear very often but are of little importance in their proper perspective. The combination of frequency of occurrence and importance allows this.

Correspondence Sheet No. 3

Correspondence Sheet No. 3 (Appendix C) consisted of the 24 perceived problems listed according to rank order of importance and frequency as reported by the head area vocational-technical school administrators. The correspondence sheet and a cover letter (Appendix C) were sent to the respondents who were asked to accept the ranking or identify how they believed the items should be rearranged. The respondents could make additional comments on the reverse side of the page.

Correspondence Sheet No. 4

Correspondence Sheet No. 4 (Appendix D) contained the rank order of perceived problems as in Correspondence Sheet No. 3. The ranking remained the same as in Correspondence Sheet No. 3 because no consensus could be reached concerning reranking the items. It was also accompanied by a cover letter (Appendix D). The head administrators were asked to respond to each item by identifying if it was a problem in their school, if the problem could be solved, and recommendations on how the problem could be solved.

Limitations of the Study

The internal validity of this study was limited to the responses submitted by the participants and the assumptions associated with this study.

Assumptions of the Study

1. It was assumed that the head area vocational-technical school administrators did provide information to the best of their ability.
2. It was assumed the rephrasing and combining of the 110 original problems identified by the respondents was done in a consistent manner so that each statement was represented by one of the 24 identified perceived problems.
3. It was assumed that this study was subject to all the assumptions associated with a mailed questionnaire.
4. It was assumed since this study dealt with a particular special interest group the results may not be generalizable.

CHAPTER IV

PRESENTATION OF FINDINGS

The purpose of this study was to identify problems in implementing metrics as the predominant measurement system in the curriculums of area vocational-technical schools in Oklahoma as perceived by the head area vocational-technical administrators and to develop recommendations for solving the identified problems.

A modified Delphi Technique was used to obtain the data for the study. The data was collected by means of four correspondence sheets.

Correspondence Sheet No. 1

Twenty of the 21 head administrators contacted returned Correspondence Sheet No. 1 (Appendix A) for a 95.2 percent response. Fourteen responses came from the initial letter, while three responses were prompted by a follow-up letter, and three responses were received after a follow-up phone call. The non-participating head administrator indicated that he did not have time to participate in the study when contacted during the phone follow-up. Correspondence Sheets No. 2, 3, and 4 were sent to that administrator in the event he did decide to participate. Table I shows the return rates for all the correspondence sheets.

There were 110 (Appendix A) individual responses to Correspondence Sheet No. 1. The researcher and his graduate committee synthesized

these into 24 perceived problem statements. These problem statements are listed below in unranked order.

1. Budget considerations for replacing hand tools.
2. Budget considerations for replacing major equipment.
3. Revision of instructional materials.
4. Teachers do not see a need to learn the metric system.
5. The teaching staff is not trained to teach metrics.
6. There are no metrics inservice programs for teachers.
7. The teaching staff is opposed to adopting metrics in the curriculum.
8. No time to incorporate metrics into vocational programs.
9. The difficulty of some vocational programs to adapt to metrics.
10. Metrics should also be taught in the comprehensive high school.
11. Students will have to be taught metrics in elementary schools in order to effectively use the system in high school.
12. Teaching metrics to adults in night classes.
13. Students resist the metric system because they fear they will not comprehend it.
14. Students do not see a need to learn the metric system.
15. Students should be trained in the customary system because they will be placed on jobs that use the customary system.
16. Lack of on-the-job experience stations for practical application.
17. Administrators do not see a need to learn the metric system.
18. Planning must be done before starting the change to the metric system.
19. The cost to the American people is too great.

20. People convert the customary system to the metric system and do not think in the metric system.
21. The public does not see a need to learn the metric system.
22. People view the change to metrics as having political overtones.
23. It is impractical for schools to change before the rest of society changes.
24. Industry is not standardizing the products it produces in metrics.

TABLE I

PARTICIPANT RETURN RATES TO CORRESPONDENCE SHEETS NO. 1, 2, 3, AND 4

	Corr. Sheet No. 1	Corr. Sheet No. 2	Corr. Sheet No. 3	Corr. Sheet No. 4
First Mailing	14	18	13	11
Follow-Up Letter	3	*	*	9
Phone Follow-Up	3	0	*	*
Total Return	20	18	13	20
Percent Return**	95.2	85.7	61.9	95.2

*These Follow-Up Procedures Not Used
**21 Administrators Contacted

Correspondence Sheet No. 2

Correspondence Sheet No. 2 (Appendix B) contained the 24 problem statements identified in Correspondence Sheet No. 1. The participants were asked to indicate on a five-point scale how frequently they anticipated the problem would occur, and also indicate on a five-point scale how important the problem would be when it did occur. Eighteen head administrators, or 85.7 percent, responded to the second correspondence sheet. A mean was calculated for each problem statement on the basis of the product of importance times frequency of occurrence. The means were also calculated for importance and frequency of occurrence considered independently. Table II shows the problem statements ranked in order of importance and frequency of occurrence.

Table III shows the ranking and mean scores of the problem statements ranked only on frequency of occurrence. A comparison is shown between that ranking and the ranking of the problem statements based on both frequency of occurrence and importance. There is very little difference between the two rankings.

Table IV shows the ranking and mean scores of the problem statements ranked by importance. A comparison is shown between that ranking and the ranking of the problem statements based on both frequency of occurrence and importance. Very few differences appear in these rankings. The major difference in the rankings is item 3, "Budget considerations for replacing major equipment," which ranked tenth in frequency of occurrence and importance and fourteenth when considered by only frequency of occurrence.

TABLE II

PROBLEM STATEMENTS RANKED BY FREQUENCY OF OCCURRENCE AND IMPORTANCE

Mean	Ranked by Frequency of Occurrence and Importance	Problem Statement
21.94	1	Metrics should also be taught in the comprehensive high school
20.89	2	Students will have to be taught metrics in elementary schools in order to effectively use the system in high school
20.39	3	The public does not see a need to learn the metric system
20.17	4	Planning must be done before starting the change to the metric system
18.78	5	People convert the customary system to the metric system and do not think in the metric system
17.11	6	Revision of instructional materials
16.22	7	The cost to the American people is too great
16.18	8	Industry is not standardizing the products it produces in metrics
16.00	9	Budget considerations for replacing hand tools
15.61	10	Budget considerations for replacing major equipment
15.50	11	Students should be trained in the customary system because they will be placed on jobs that use the customary system
15.39	12	People view the change to metrics as having political overtones
15.28	13	The teaching staff is not trained to teach metrics
14.94	14	Students do not see a need to learn the metric system
14.17	15	Teaching metrics to adults in night classes

TABLE II (Continued)

Mean	Ranked by Frequency of Occurrence and Importance	Problem Statement
13.78	16	Students resist the metric system because they fear they will not comprehend it.
12.88	17	Lack of on-the-job experience stations for practical application
12.67	18	The difficulty of some vocational programs to adapt to metrics
12.39	19	It is impractical for schools to change before the rest of society changes
10.61	20	Teachers do not see a need to learn the metric system
10.44	21	There are no metrics inservice programs for teachers
9.94	22	The teaching staff is opposed to adopting metrics in the curriculum
8.88	23	Administrators do not see a need to learn the metric system
8.72	24	No time to incorporate metrics into vocational programs

TABLE III

PROBLEM STATEMENTS RANKED BY FREQUENCY OF OCCURRENCE

Mean	Ranked by Frequency of Occurrence and Importance	Ranked by Frequency of Occurrence	Problem Statement
4.72	1	1	Metrics should also be taught in the comprehensive high school
4.55	2	2	Students will have to be taught metrics in elementary schools in order to effectively use the system in high school
4.50	3	3	The public does not see a need to learn the metric system
4.38	4	4	Planning must be done before starting the change to the metric system
4.22	5	5	People convert the customary system to the metric system and do not think in the metric system
4.00	6	6	Revision of instructional materials
3.94	8	7	Industry is not standardizing the products it produces in metrics
3.77	7	9	The cost to the American people is too great
3.77	9	9	Budget considerations for replacing hand tools
3.77	11	9	Students should be trained in the customary system because they will be placed on jobs that use the customary system
3.72	14	11.5	Students do not see a need to learn the metric system
3.72	12	11.5	People view the change to metrics as having political overtones

TABLE III (Continued)

Mean	Ranked by Frequency of Occurrence and Importance	Ranked by Frequency of Occurrence	Problem Statement
3.55	15	13	Teaching metrics to adults in night classes
3.50	10	14	Budget considerations for replacing major equipment
3.44	13	15.5	The teaching staff is not trained to teach metrics
3.44	16	15.5	Students resist the metric system because they fear they will not comprehend it
3.35	17	17	Lack of on-the-job experience stations for practical application
3.33	18	18	The difficulty of some vocational programs to adapt to metrics
3.05	19	19	It is impractical for schools to change before the rest of society changes
3.00	20	20	Teachers do not see a need to learn the metric system
2.72	23	21	Administrators do not see a need to learn the metric system
2.70	21	22	There are no metrics inservice programs for teachers
2.66	22	23	The teaching staff is opposed to adopting metrics in the curriculum
2.38	24	24	No time to incorporate metrics into vocational programs

TABLE IV

PROBLEM STATEMENTS RANKED
BY IMPORTANCE

Mean	Ranked by Frequency of Occurrence and Importance	Ranked by Importance	Problem Statement
4.55	1	1	Metrics should also be taught in the comprehensive high school
4.50	2	2	Students will have to be taught metrics in elementary schools in order to effectively use the system in high school
4.44	10	3	Budget considerations for replacing major equipment
4.38	4	4	Planning must be done before starting the change to the metric system
4.33	3	5	The public does not see a need to learn the metric system
4.22	6	7.5	Revision of instructional materials
4.22	7	7.5	The cost to the American people is too great
4.22	5	7.5	People convert the customary system to the metric system and do not think in the metric system
4.22	13	7.5	The teaching staff is not trained to teach metrics
4.16	9	10	Budget considerations for replacing hand tools
3.88	11	11	Students should be trained in the customary system because they will be placed on jobs that use the customary system
3.82	8	12	Industry is not standardizing the products it produces in metrics

TABLE IV (Continued)

Mean	Ranked by Frequency of Occurrence and Importance	Ranked by Importance	Problem Statement
3.77	15	13	Teaching metrics to adults in night classes
3.72	14	14.5	Students do not see a need to learn the metric system
3.72	12	14.5	People view the change to metrics as having political overtones
3.66	16	16	Students resist the metric system because they fear they will not comprehend it
3.61	21	17.5	There are no metrics inservice programs for teachers
3.61	18	17.5	The difficulty of some vocational programs to adapt to metrics
3.50	19	19	It is impractical for schools to change before the rest of society changes
3.47	17	20	Lack of on-the-job experience stations for practical application
3.44	20	21	Teachers do not see a need to learn the metric system
3.33	24	22	No time to incorporate metrics into vocational programs
3.22	22	23	The teaching staff is opposed to adopting metrics in the curriculum
3.00	23	24	Administrators do not see a need to learn the metric system

Correspondence Sheet No. 3

Correspondence Sheet No. 3 (Appendix C) was returned by 13, or 61.9 percent of the head administrators. Nine of the 13, or 69.2 percent, of the responses agreed with the original ranking. Two of the responses called for an extensive reranking of the problem statements, while the remaining other two suggested only minor changes. There was no apparent pattern in the responses suggesting change, so the ranking was left intact. Correspondence Sheet No. 3 also provided for any comment the respondents desired to make. These comments are included in Appendix C.

Twenty head administrators returned Correspondence Sheet No. 4 (Appendix D) for a 95.2 percent response. Nine of those responses were received after a follow-up letter was sent.

Correspondence Sheet No. 4

Correspondence Sheet No. 4 asked the subjects to respond to each of the problem statements by identifying, if it was a problem in their school, if it could be solved, and if it could be solved for them to make recommendations on how the problem could be solved. The results of Correspondence Sheet No. 4 are contained in Table V.

In Table VI the problem statements are ranked by the percentage of schools in which they occur. Eighteen of the items occur in a majority of the schools.

TABLE V

RECOMMENDATIONS FOR THE SOLUTIONS OF THE PROBLEM STATEMENTS RANKED BY FREQUENCY OF OCCURRENCE AND IMPORTANCE

Problem Statements and Recommendations	Is this a problem in the administrator's school? Yes	No	Total	Can this problem be solved? Yes	No	Total
1. Metrics should also be taught in the comprehensive high school	11 64.7%	6 35.5%	17	12 100%	0	12
a. Local public schools will solve the problem but it will take time; b. Regulations of the State Department of Education; c. Include in science and math programs; d. Cooperative effort from state and local level--mandatory effort; e. Coordinate with high schools; f. Require it; g. Just change						
2. Students will have to be taught metrics in elementary schools in order to effectively use the sytem in high school	11 68.8%	5 31.2%	16	11 100%	0	11
a. By starting beginning math students in metrics; b. Regulations of the State Department of Education; c. Include in science and math programs; d. Inservice and then teach; e. Coordinate with high schools; f. Require it; g. Just change						
3. The public does not see a need to learn the metric system	12 63.2%	7 36.8%	19	8 80.0%	2 20.0%	10
a. Hopefully by special classes and the necessity for change; b. Regulation of the State Department of Education; c. Adult evening programs in metrics; d. Not a local level entry--must begin at national level; e. By implementation; f. Educate the public						
4. Planning must be done before starting the change to the metric system	12 66.7%	6 33.3%	18	14 100%	0	14
a. By the State Education Department, Vocational-Technical Department and school leaders together; b. Regulations of the State Department of Education; c. Industrial planning and change will need to be systematic; d. By committee to establish plans; e. Inservice for teachers; f. Work with communities; g. Do it						

TABLE V (Continued)

Problem Statement and Recommendations	Is this a problem in the administrator's school? Yes	No	Total	Can this problem be solved? Yes	No	Total
5. People convert the customary system to the metric system and do not think in the metric system	12 66.7%	6 33.3%	18	12 85.7%	2 14.3%	14
a. Only when the necessity to do so comes about; b. Regulation of the State Department of Education; c. When all equipment converts to the metric system the customary system will be forgotten; d. Start teaching metrics in grade school; e. Time will take care of this--to assist encourage exclusion of the old system; f. Through instruction; g. One of the biggest problems today; h. Teach it early in the elementary schools; i. Teach metrics--not how to convert from customary to metric; j. Inservice and continuing education						
6. Revision of instructional materials	15 83.3%	3 16.7%	18	14 87.5%	2 12.5%	16
a. Materials published and money to purchase; b. Regulations of the State Department of Education; c. Curriculum can easily be adapted to teach metrics; d. Need help from State Curriculum Division; e. Through research; f. At a terrible cost; g. Firms producing materials will do this to meet demand						
7. The cost to the American people is too great	12 66.7%	6 33.3%	18	5 55.6%	4 44.4%	9
a. A systematic approach will prevent many problems and reduce costs; b. This is everyone's problem, experience will regulate it; c. Through proper funding; d. Depends on the product						
8. Industry is not standardizing the products it produces in metrics	9 52.9%	8 47.1%	17	9 75.0%	3 25.0%	12
a. Some will not change; b. Only when industry is required to standardize and sees a need to change; c. Government enforcement; d. The consumer and time will have to work on this; e. Doubtful; f. Only by requiring it to be done; g. Over a period of years						

TABLE V (Continued)

	Problem Statement and Recommendations	Is this a problem in the administrator's school? Yes	No	Total	Can this problem be solved? Yes	No	Total
9.	Budget considerations for replacing hand tools	17 85.0%	3 15.0%	20	10 76.9%	3 23.1%	13
	a. Federal funds should be provided for this; b. Regulations of the State Department of Education; c. Change can come over the period of a few years without too much cost--replacement of tools to metrics; d. More money from the state; e. Through a phased priority evaluative system; f. Adequate; g. Not enough money; h. More money; i. Long-range planning						
10.	Budget considerations for replacing major equipment	16 80.0%	4 20.0%	20	9 75.0%	3 25.0%	12
	a. State, Federal and local funds will have to be budgeted; b. As large equipment is replaced change to metrics over a period of years; c. More money from the state; d. As time dictates the requirements by local communities; e. Adequate funding; f. Not enough money; g. More money; h. Long-range planning.						
11.	Students should be trained in the customary system because they will be placed on jobs that use the customary system	13 68.4%	6 31.6%	19	8 72.7%	3 27.3%	11
	a. Until industry changes students must be trained in the customary system; b. Students will have to be cross trained; c. Carpentry for example--all old homes are built on the old method of measurement; d. Have to train in both for a period						
12.	People view the change to metrics as having political overtones	11 57.9%	8 42.1%	19	4 40.0%	6 60.0%	10
	a. Just with time; b. Not at local level--the government will have to assert its intention; c. Prove need						
13.	The teaching staff is not trained to teach metrics	14 73.7%	5 26.3%	19	11 100%	0	11
	a. Short in-service workshops; b. Can be done with in-service training; c. Workshops on inservice education will solve this problem; d. Local administrative problem--transition is not this big of a problem; e. Training; f. By requiring them to get extra training						

TABLE V (Continued)

	Problem Statement and Recommendations	Is this a problem in the administrator's school? Yes	No	Total	Can this problem be solved? Yes	No	Total
14.	Students do not see a need to learn the metric system	15 78.9%	4 21.1%	19	11 100%	0	11
	a. By the industry and businesses changing to metrics; b. When metrics becomes a requirement for a job then change will come; c. Through demonstrations of the merit, program will sell itself; d. Prove need; e. For some students but not all; f. Education as to the importance; g. Teach it early in the elementary schools						
15.	Teaching metrics to adults in night classes	10 52.6%	9 74.4%	19	9 100%	0	9
	a. Problem will be to overcome dogmatism--learn by doing; b. Through orientation; c. More money for programs; d. Education as to importance						
16.	Students resist the metric system because they fear they will not comprehend it	13 65.0%	7 35.0%	20	8 100%	0	8
	a. No more than other learning experiences; b. Constant use; c. Appropriate teaching techniques and resources will alleviate this; d. Prove need; e. Educate them; f. Through training materials; g. Education as to importance						
17.	Lack of on-the-job experience stations for practical applications	15 78.7%	4 21.1%	19	11 91.7%	1 8.3%	12
	a. Being more selective of job sites; b. When industry changes to metrics this will change; c. Working through local skill area advisory committees; d. Increase stations; e. But with more finances; f. Will only come with time						
18.	The difficulty of some vocational programs to adapt to metrics	12 63.2%	7 36.8%	19	8 88.9%	1 11.1%	9
	a. Isolate the difficult areas and plan (resources and training) in advance; b. Doubtful; c. Will have to take time out to teach metrics, time could be better spent; d. Very true						

TABLE V (Continued)

	Problem Statement and Recommendations	Is this a problem in the administrator's school? Yes	No	Total	Can this problem be solved? Yes	No	Total
19.	It is impractical for schools to change before the rest of society changes	10 50.0%	10 50.0%	20	7 77.8%	2 22.2%	9
	a. Schools must be the change agent; b. Begin at the elementary level; c. By mandate						
20.	Teachers do not see a need to learn the metric system	9 45.0%	11 55.0%	20	7 100%	0	7
	a. When metrics become necessary teachers will accept changes; b. Educational inservice programs will overcome this; c. Doubtful; d. Require it						
21.	There is no metrics inservice programs for teachers	6 30.0%	14 70.0%	20	7 100%	7	7
	a. Plan and implement appropriate inservice training programs; b. Provided by authorities; c. More money and time						
22.	The teaching staff is opposed to adopting metrics in the curriculum	6 31.6%	13 68.4%	19	7 100%	0	7
	a. Some; b. Initiate an appropriate inservice training program; c. Prove need; d. Require it; e. As industry changes they will see the need						
23.	Administrators do not see a need to learn the metric system	6 31.6%	13 68.4%	19	7 100%	0	7
	a. Be given specific resources to do the job; b. Through proof of need and instruction; c. We must be the forerunners						
24.	No time to incorporate metrics into vocational programs	8 42.1%	11 57.6%	19	6 100%	0	6
	a. Would be difficult but could be done; b. Time can be secured through a re-examination of priorities; c. Take time from regular training programs; d. No one wants to spend time on something he does not see used in industry						

TABLE VI

PROBLEM STATEMENTS RANKED BY PERCENTAGE OF SCHOOLS IN WHICH THEY OCCUR

Rank	Percentage of Schools in Which They Occur	Problem Statements
1	85.0	Budget considerations for replacing hand tools
2	83.3	Revision of instructional materials
3	80.0	Budget considerations for replacing major equipment
4	78.9	Students do not see a need to learn the metric system
5	78.7	Lack of on-the-job experience stations for practical application
6	73.7	The teaching staff is not trained to teach metrics
7	68.8	Students will have to be taught metrics in elementary schools in order to effectively use the system in high school
8	68.4	Students should be trained in the customary system because they will be placed on jobs that use the customary system
10	66.7	Planning must be done before starting the change to the metric system
10	66.7	People convert the customary system to the metric system and do not think in the metric system
10	66.7	The cost to the American people is too great
12	65.0	Students resist the metric system because they fear they will not comprehend it
13	64.7	Metrics should be taught in the comprehensive high school
14.5	63.2	The public does not see a need to learn the metric system

TABLE VI (Continued)

Rank	Percentage of Schools in Which They Occur	Problem Statements
14.5	63.2	The difficulty of some vocational programs to adapt to metrics
16	57.9	People view the change to metrics as having political overtones
17	52.9	Industry is not standardizing the products it produces in metrics
18	52.6	Teaching metrics to adults in night classes
19	50.0	It is impractical for schools to change before the rest of society changes
20	45.0	Teachers do not see a need to learn the metric system
21	42.1	No time to incorporate metrics into vocational programs
22.5	31.6	The teaching staff is opposed to adopting metrics in the curriculum
22.5	31.6	Administrators do not see a need to learn the metric system
24	30.0	There are no metrics inservice programs for teachers

In Table VII the problem statements are ranked by the percentage of administrators who believe they can be solved. The administrators were in total agreement on items 1 - 12, believing they could be solved. Only one item, "people view the change to metrics as having political overtones," did the majority of the respondents believe could not be solved.

Table VIII shows a comparison of all the previous rankings.

TABLE VII

PROBLEM STATEMENTS RANKED BY PERCENTAGE OF ADMINISTRATORS WHO BELIEVE THEY CAN BE SOLVED

Rank	Percentage of Administrators Who Believe They Can Be Solved	Problem Statement
6.5	100.0	Metrics should also be taught in the comprehensive high school
6.5	100.0	Students will have to be taught metrics in elementary schools in order to effectively use the system in high school
6.5	100.0	Planning must be done before starting the change to the metric system
6.5	100.0	The teaching staff is not trained to teach metrics
6.5	100.0	Students do not see a need to learn the metric system
6.5	100.0	Teaching metrics to adults in night classes
6.5	100.0	Students resist the metric system because they fear they will not comprehend it
6.5	100.0	Teachers do not see a need to learn the metric system
6.5	100.0	There are no metrics inservice programs for teachers
6.5	100.0	The teaching staff is opposed to adopting metrics in the curriculum
6.5	100.0	Administrators do not see a need to learn the metric system
6.5	100.0	No time to incorporate metrics into vocational programs
13	91.7	Lack of on-the-job experience stations for practical application

TABLE VII (Continued)

Rank	Percentage of Administrators Who Believe They Can Be Solved	Problem Statement
14	88.9	The difficulty of some vocational programs to adapt to metrics
15	87.5	Revision of instructional materials
16	85.7	People convert the customary system to the metric system and do not think in the metric system
17	80.0	The public does not see a need to learn the metric system
18	77.8	It is impractical for schools to change before the rest of society changes
19	76.9	Budget considerations for replacing hand tools
20.5	75.0	Budget considerations for replacing major equipment
20.5	75.0	Industry is not standardizing the products it produces in metrics
22	72.7	Students should be trained in the customary system because they will be placed on jobs that use the customary system
23	55.6	The cost to the American people is too great
24	40.0	People view the change to metrics as having political overtones

TABLE VIII

THE RANKING OF PROBLEM STATEMENTS BY FREQUENCY OF OCCURRENCE AND IMPORTANCE, FREQUENCY OF OCCURRENCE, IMPORTANCE, PERCENTAGE OF SCHOOLS IN WHICH THEY OCCUR, AND THE PERCENTAGE OF ADMINISTRATORS WHO BELIEVE THE PROBLEM CAN BE SOLVED

Frequency of Occurrence and Importance	Frequency of Occurrence	Importance	Percentage of Schools in Which They Occur	Percentage of Administrators Who Believe They Can Be Solved	Problem Statement
1	1	1	13	6.5	Metrics should also be taught in the comprehensive high school
2	2	2	7	6.5	Students will have to be taught metrics in elementary schools in order to effectively use the system in high school
3	3	5	14.5	17	The public does not see a need to learn the metric system
4	4	4	10	16	Planning must be done before starting the change to the metric system
5	5	7.5	10	16	People convert the customary system to the metric system and do not think in the metric system
6	6	7.5	2	15	Revision of instructional materials

TABLE VIII (Continued)

Frequency of Occurrence and Importance	Frequency of Occurrence	Importance	Percentage of Schools in Which They Occur	Percentage of Administrators Who Believe They Can Be Solved	Problem Statement
7	9	7.5	10	23	The cost to the American people is too great
8	7	12	17	20.5	Industry is not standardizing the products it produces in metrics
9	9	10	1	19	Budget considerations for replacing hand tools
10	14	3	3	20.5	Budget considerations for replacing major equipment
11	9	11	8	22	Students should be trained in the customary system because they will be placed on jobs that use the customary system
12	11.5	14.5	16	24	People view the change to metrics as having politicial overtones
13	15.5	7.5	6	6.5	The teaching staff is not trained to teach metrics
14	11.5	14.5	4	6.5	Students do not see a need to learn the metric system

TABLE VIII (Continued)

Frequency of Occurrence and Importance	Frequency of Occurrence	Importance	Percentage of Schools in Which They Occur	Percentage of Administrators Who Believe They Can Be Solved	Problem Statement
15	13	13	18	6.5	Teaching metrics to adults in night classes
16	15.5	16	12	6.5	Students resist the metric system because they feel they will not comprehend it
17	17	20	5	13	Lack of on-the-job experience stations for practical application
18	18	17.5	14.5	14	The difficulty of some vocational programs to adapt to metrics
19	19	19	19	18	It is impractical for schools to change before the rest of society changes
20	20	21	20	6.5	Teachers do not see a need to learn the metric system
21	22	17.5	24	6.5	There are no metrics inservice programs for teachers

TABLE VIII (Continued)

Frequency of Occurrence and Importance	Frequency of Occurrence	Importance	Percentage of Schools in Which They Occur	Percentage of Administrators Who Believe They Can Be Solved	Problem Statement
22	23	23	22.5	6.5	The teaching staff is opposed to adopting metrics in the curriculum
23	21	24	22.5	6.5	Administrators do not see a need to learn the metric system
24	24	22	21	6.5	No time to incorporate metrics into vocational programs

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to identify problems, as perceived by the head area vocational-technical school administrators, in implementing metrics as the predominant measurement system in the curriculums of area vocational-technical schools in Oklahoma and to develop recommendations for solving the problems. A modification of the Delphi Technique was used to solicit responses from head area vocational-technical school administrators to identify and rank the problems in implementing metrics. The study also sought the respondents' suggested recommendations as guidelines for solving these problems.

Objectives of the Study

The study had three specific objectives:

1. To identify problems perceived by head Oklahoma area vocational-technical school administrators in introducing metric measurement systems in their schools;
2. To rank the perceived problems by significance as determined by their frequency of occurrence and importance; and
3. To develop a set of recommendations to solve the perceived problems.

Procedure for the Study

The subjects responded to the open-ended statement:

> As the head administrator for an area vocational-technical school in Oklahoma, I perceive the following problems in implementing metrics as the predominant measurement system in the curriculum of my school as being:

This statement prompted 110 responses from the administrators. The statements were evaluated and synthesized by the researcher and his research committee into 24 problem statements. These problem statements were returned to the subjects to be ranked on the basis of frequency of occurrence and importance. The ranking was compiled and returned to the administrators for evaluation. No changes were made in the ranking. The respondents then suggested recommendations as guidelines for solving the problem statements.

Review of the Literature

A review of the literature included: (1) the history of the metric system, (2) studies dealing with educational problems related to the metric system, and (3) the Delphi Technique.

Major Findings of the Study

A modified Delphi Technique was used to identify and rank problems in implementing metrics in the administrators' schools. Twenty-four problem statements were ranked on the basis of five considerations: frequency of occurrence and importance, frequency of occurrence, importance, percentage of schools in which they occur, and the percentage of administrators who believe the problem can be solved. The 24 problem statements are:

1. Metrics should also be taught in the comprehensive high school
2. Students will have to be taught metrics in elementary schools in order to effectively use the system in high school
3. The public does not see a need to learn the metric system
4. Planning must be done before starting the change to the metric system
5. People convert the customary system to the metric system and do not think in the metric system
6. Revision of instructional materials
7. The cost to the American people is too great
8. Industry is not standardizing the products it produces in metrics
9. Budget considerations for replacing hand tools
10. Budget considerations for replacing major equipment
11. Students should be trained in the customary system because they will be placed on jobs that use the customary system
12. People view the change to metrics as having political overtones
13. The teaching staff is not trained to teach metrics
14. Students do not see a need to learn the metric system
15. Teaching metrics to adults in night classes
16. Students resist the metric system because they fear they will not comprehend it
17. Lack of on-the-job experience stations for practical application
18. The difficulty of some vocational programs to adapt to metrics

19. It is impractical for schools to change before the rest of society changes
20. Teachers do not see a need to learn the metric system
21. There are no metrics inservice programs for teachers
22. The teaching staff is opposed to adopting metrics in the curriculum
23. Administrators do not see a need to learn the metric system
24. No time to incorporate metrics into vocational programs.

Conclusions

The following conclusions were based on the review of the literature and the data presented in this study. These conclusions represent many and varied groups represented by the review of literature, and the opinions of the head area vocational-technical school administrators as expressed in the study. They are listed in no particular order.

1. There is a need for systematic planning concerned with the adoption of the metric system in schools.
2. Additional funding from federal and state governments is necessary to revise or replace existing tools and equipment.
3. Present instructional materials should be revised or replaced.
4. There is a need to adopt the metric system in the curriculums of all public education.
5. Schools cannot teach the metric system exclusively until business, industry and society have adopted it.
6. There is a reluctance on the part of the public to change to the metric system.
7. Inservice teacher training programs in metrics are needed.

8. There is a need for metric awareness activities for all sections of the community.
9. Many of the problems ranked most significant by the respondents were problems whose greatest impact affects segments of society other than the local area vocational-technical school.
10. It was difficult for some of the respondents to make specific recommendations as can be seen. Some recommendations appear to be comments.

Recommendations

Several recommendations appear to be appropriate as a result of this study. These recommendations are:

1. The efforts of state and national governments should be incorporated to develop a comprehensive plan for implementing metrics in the curriculums of vocational-technical schools. This plan should be responsive to the requirements and conditions of the local school agencies and provide leadership for the change.
2. The federal and state governments should provide procedures whereby local school districts can obtain supplemental funding to defray the cost of revising or replacing existing tools and equipment which are outdated by metric conversion. Every attempt should be made to insure the changes are appropriate to provide quality instruction matched to employment needs.
3. The Curriculum and Instructional Materials Center of the State Department of Vocational and Technical Education should

include metrics in their instructional materials. The extent to which metrics is included should reflect the extent to which the occupation has adopted metrics. Vocational teachers should be encouraged to revise or replace their teaching aids to reflect the measurement system used in their occupation.

4. The State Department of Education should develop a comprehensive plan for implementing metrics in the curriculums of all public schools.
5. All public schools should proceed with metric conversion. Local school agencies should be given the latitude to proceed at a speed appropriate for their community. Care should be taken to prevent any school system from such speed or procrastination on metric conversion so as to ultimately isolate themselves from the rest of society.
6. Federal, state, and local educational agencies should maintain a program of metric awareness to stimulate an interest and understanding of the metric system.
7. Vocational-technical teachers should participate in inservice training programs or courses in metrics.

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APPENDIX A

HEAD AREA VOCATIONAL-TECHNICAL SCHOOL ADMINISTRATORS

Mr. Austin Barragree, Supt.
Oklahoma Northwest Area Vo-Tech
School District No. 10, Box 784
Alva, OK 73717

Dr. John Bruton, Supt.
Gordon Cooper Area Vo-Tech School
District No. 5, Box 848
Shawnee, OK 74801

Mr. Kenneth Carleton, Supt.
Mid-American Area Vo-Tech School
District No. 8, Box H
Wayne, OK 73095

Dr. James Carpenter, Supt.
Pioneer Area Vo-Tech School
District No. 13, Box 1418
Ponca City, OK 74601

Dr. Wayne Earnest, Director
Foster Estes Area Vo-Tech Center
4901 S. Bryant
Route 8, Box 195A
Oklahoma City, OK 73129

Mr. J. R. Gilliland, Supt.
Canadian Valley Area Vo-Tech
School District No. 6, Box 579
El Reno, OK 73036

Mr. Chester Hendrix, Supt.
Indian Capital Area Vo-Tech
School District No. 4
Route 5, Box 237
Muskogee, OK 74401

Mr. John Hopper, Supt.
Central Oklahoma Area Vo-Tech
School District No. 3
3 CT Circle
Drumright, OK 74030

Mr. J. W. Ridge, Supt.
O. T. Autry Area Vo-Tech School
District No. 15
1201 W. Willow
Enid, OK 73701

Dr. Orbra Hulsey, Supt.
Caddo-Kiowa Area Vo-Tech School
District No. 2
P.O. Box 190
Fort Cobb, OK 73038

Mr. Jack Kale, Director
Midwest City Vo-Tech Center
1621 Maple Drive
Midwest City, OK 73110

Mr. Jerry Kirk, Supt.
Western Oklahoma Area Vo-Tech School
P.O. Box 149
Burns Flat, OK 73624

Dr. Joe Lemley, Supt.
Tulsa Coutny Area Vo-Tech Center
3420 S. Memorial
Tulsa, OK 74145

Mr. Delbert Morrison, Supt.
Red River Area Vo-Tech Center
3300 W. Boisdare, Box 1088
Duncan, OK 73533

Mr. Kenneth Phelps, Supt.
Tri-County Area Vo-Tech Center
P.O. Box 3325
Bartlesville, OK 74003

Mr. Bill Powers, Supt.
Kiamichi Area Vo-Tech School
District No. 7
P.O. Box 490
Wilburton, OK 74578

Mr. Bob Reed, Supt.
Northeast Oklahoma Area Vo-Tech
School District No. 11
Drawer D
Afton, OK 74331

Dr. Fred Shultz, Supt.
Indian Meridian Area Vo-Tech School
District No. 16
Route 5, Box 234 A
Stillwater, OK 74074

Mr. Jack Stone, Supt.
Southern Oklahoma Area Vo-Tech School
Ardmore, OK 73401

Mr. Milton Worley, Supt.
Great Plains Area Vo-Tech School District No. 9
4500 W. Lee Blvd.
Lawton, OK 73501

Dr. Clovis Weatherford, Supt.
Moore-Norman Area Vo-Tech School District No. 17
4701 N.W. 12th
Norman, OK 73069

Oklahoma State University

SCHOOL OF OCCUPATIONAL AND ADULT EDUCATION

STILLWATER, OKLAHOMA 74074
CLASSROOM BUILDING 406
(405) 624-6275

January 2, 1978

During the past year I conducted metric classes in eight area vocational-technical schools in Oklahoma. I enjoyed the time I spent in these schools and the participation of the vocational teachers in the classes. This association with Oklahoma area vocational-technical schools has been a rewarding experience for me. I am attempting to use this experience as a basis for my advanced degree research requirement.

Enclosed with this letter is a brief description of my proposed study. Also enclosed is an opinionnaire which is part of the first step of the study.

I would appreciate your assistance in this study. Please complete the enclosed opinionnaire and return it to me at your earliest convience.

Sincerely,

Paul McNeary

PRM/bh
Enclosure

Brief Explanation of Proposed Activity

The purpose of my research study is to identify problems foreseen by Oklahoma area school administrators in implementing the metric measurement system into the curriculums of Oklahoma area vocational-technical schools. The information provided by the area school administrators will be kept confidential and all materials and data will be treated anonymously. The method used to identify these problems will be the Delphi technique. After these problems have been identified participating area school administrators will be invited to develop guidelines as recommendations for possible solutions to these problems. Three separate mailings will be used to gather and finalize your opinions.

After the preceived problems have been identified by the Delphi technique I will attempt to arrange a meeting of area school administrators at a mutually agreeable time. This meeting could be held in conjunction with a regularly scheduled meeting of area school administrators, or at a special meeting to be conducted on the Oklahoma State University campus. The purpose of this meeting will be to develop guidelines as recommendations for solving the previously identified problems in implementing metrics in the curriculums of Oklahoma area vocational-technical schools.

The primary use of the guidelines as recommendations developed in this meeting will be used for my research. However these guidelines will be available for use by the area school administrators and the Oklahoma State Department of Vocational-Technical Education.

Sincerely,

Paul McNeary

Paul McNeary

Approved by:

Lloyd L. Wiggins
Graduate Committee Chairman

Larry Hansen
Asst. Director, Area Vocational Education and Manpower Training

CORRESPONDENCE SHEET NO. 1

Please list endings, no particular order of importance required to the following statement.

As the head administrator for an area vocational-technical school in Oklahoma I perceive the following problems in implementing metrics as the predominant measurement system in the curriculum of my school as being:

LIST RESPONSES BELOW

NUMBER ONE:

NUMBER TWO:

NUMBER THREE:

NUMBER FOUR:

NUMBER FIVE:

NUMBER SIX:

NUMBER SEVEN:

NUMBER EIGHT:

NUMBER NINE:

NUMBER TEN:

Thank you

Please return this in the enclosed envelope.

Oklahoma State University

SCHOOL OF OCCUPATIONAL AND ADULT EDUCATION

STILLWATER, OKLAHOMA 74074
CLASSROOM BUILDING 406
(405) 624-6276

January 27, 1978

I received fourteen responses from the twenty-one administrators I contacted by letter on January 2, 1978. I have not received your response at the present time. The purpose of the letters was to identify problems foreseen by Oklahoma area school administrators in implementing the metric measurement system into the curriculum of Oklahoma area vocational-technical schools.

Your response is needed to insure that the study reflects the problems foreseen by all head area vocational-technical school administrators in Oklahoma. In the event your response has been delayed in the mail, I have enclosed a brief explanation of the proposed activity, and the opinionnaire which is part of the first step of the study.

I would appreciate your assistance in this study. Please complete the enclosed opinionnaire and return it to me at your earliest convenience.

Sincerely,

Paul McNeary

Paul McNeary

PRM/bh
Enclosure

RESPONSES TO CORRESPONDENCE SHEET NO. 1

The expense involved in change

New tools - particularly those used for measuring

Equipment now used having to be replaced or modified

Conversion of tools

Prohibitive cost - district is not financially able to make conversions in regard to supplies for all students at one time

Purchasing of new tools and equipment

Cost of adding metric conversion to equipment

Expense of tools, textbooks, and equipment for conversion

Cost of changing major equipment to metric

If we teach metrics as the predominant measurement system, we would need to purchase and use metric tools and equipment. This could be expensive.

Since additional tools for teaching metrics will be required, one has to be concerned about the budget.

Finances (different equipment, hand tools, textbooks, audio visual materials, etc.)

Cost of changing tools to metric

The equipment now in use is in units of measure other than metrics, therefore, the cost of updating all equipment

The overall cost in the change of equipment and materials

Funds not available for complete changeover

The increased expense of maintaining two inventories of tools - American standard and metric

The cost of equipment that is needed in the beginning and, also, for replacement; all of this must be considered. In some areas it will be very expensive.

Lack of metric aids (books, equipment, materials, supplies, etc.)

New books revised with all terms and measurements stated in metrics

Textbooks will be obsolete and need to be revised

Curriculum revision and cost

The changeover of curriculum materials

Need not totally prevalent for change at the present time; an estimate is that approximately 5% of our instructions deal with metric system at the present time.

Reluctance to the forced change by instruction

I can foresee a dual system for many years. For example, we teach metrics in food service, who will use it?????

Surrent groups who do not deal in national issues but deal strictly within the continental United States see no advantage to changing.

You can lead a horse to water, but you cannot make him drink--need I say more?

Desire of people to change to metrics

Not enough interest

Motivation

The extra cost for the training of teachers

Uninformed staff - not knowledgeable in teaching of the metric system

Education of instructors in the metric system

Getting the teachers oriented

Training instructors

Training the instructor!!

Acceptance by and training of the instructional staff

Preparing instructors to teach metrics to their students in relationship to the program they teach

Inservice training for instructors, not only to teach them the entire metric system (weight, liquid measure, linear and solid measure, etc.) but to teach them how to teach the metric system

In-depth inservice training of total staff personnel

Lack of adequate inservice training for teachers to become knowledgeable about the metric system

Overcoming the resistance to change in both educators and students

Teachers' reluctance to learn and change to the metric system

Time element in regard to taking away from regular teaching and course offering in the class period

Reluctance of instructors to spend necessary time on this

A new system also means new curriculum--in all areas. It means texts must now use the metric system as well as state vo-tech materials. A short course in metrics is not the answer.

Considerable problems in book and equipment changeover

Allowance for additional time required for inclusion within the curriculum

Time to put teaching of metrics into our curriculum

The instructor already has more to teach concerning his craft than he can effectively cover in 2 years without introducing new concepts.

Shortage of time in present class plans to spend additional time necessary for metrics

We do not have a formal math program in our school. Therefore, metrics will have to be a part of our shop program related curriculum.

Implementing metric instruction in elementary school to provide students with basic knowledge

"If" this is a definite societal change then you should be working with elementary education to train the society and not start at the top end.

Metrics, if taught in elementary schools will be a great help. Our students are not always real sound in math of any kind.

The development of suitable instructional materials that are directly associated with student's needs in the specific program of training

Many secondary students have problems with our present system which will compound with the introduction of metrics.

Fear of not being able to comprehend

The difficulty of high school juniors, seniors, and adults to adapt to the metric system without having an adverse effect on the amount of learning in their program of study

Fear of finding out that the traditional measurement system was not fully comprehended

Not enough emphasis on the need for change

Little or no pressure for change

Getting students to believe that there is a need

Acceptance by students of the double standard of having to use and learn dual systems

Teachers work in present system and use present system every day and see no reason to change due to above mentioned factors

Teachers accepting the responsibility for teaching metrics

Lack of on-the-job experience stations for practical application

Finding time for teachers to attend classes

The re-education of instructional staff, administrators, and everyone involved in educational delivery system

Our instructors are, and will continue to teach those things that directly relate to their field.

"Conversion tables" have contributed to considerable confusion about metrics. It will take quite a lot of effort to get people to stop viewing metrics as a "fractionizing" of our present system, e.g., 1 centimeter = 0.3937 inches.

"Public" resistance to major change in a traditional system or method

I just don't like the idea and I think that it is entirely unnecessary.

Unless public acceptance is changed at the same time, little need to teach metrics

Overcoming public apathy

Attitude of instructors, students and the public toward the change to the metric system

Acceptance of change by students and community

Teaching something as abstract as metrics, to a student who has no immediate need for it is useless.

The metric system will not work until all traces of the old system are gone. Tell me how this can be accomplished.

The cost to the people of America to make the change

Special interest groups see this as a high cost to the United States to change one's currency, signs, literature, etc.

Predominant measuring system of the United States, business, industry, education, social groups is the English system

Teaching metrics to adults in night classes

Changing terminology

The difficulty of some training programs, such as the construction trades, adapting to the metric system

In the area vo-tech schools we teach in a three-hour block and our enrollment is composed of membership from several high schools. Our three-hour blocks are pretty much devoted to "hands-on training" and the comsumption of time taken away from classroom instruction would impair the "hands-on training." It appears that the metric system should be implemented through the comprehensive high schools, probably math classes, and let the vo-tech schools enrich and enhance the training received at the high schools.

Literature printed by special interest groups see this as the U.S. giving up a system to follow other governmental systems

Keep the teaching system as simple as possible. Teach only what is needed to do the job.

Students and instructors familiar with other system

Getting students to "think" and "talk" metric will be a problem comparable to getting a student to speak only English when he comes from a home where only Spanish is spoken.

Students will be placed on jobs that demand they be trained in present measuring system

Manufactured items that students utilize (other than health) is English measuring system

Lack of interest on the part of the students and their reluctance to change

As soon as industry moves to a predominate metric system of measurement we will move to a predominate teaching of metrics

Not practical until change is made outside of school

The gap which will exist for some time between <u>schooling</u> about metrics and the <u>application</u> of metrics in business and industry

Explain why we are teaching it and industry isn't using it

Coordinating change over with the needs of industry

Standardizing the products produced in metric (example: pitch of thread on bolts from Ford, GM, Datsun, etc., are all different)

Governmental intervention

Too much administrative work

Lack of resource centers - centers are not available where students and teachers can become knowledgeable on an individual basis

Concentrated effort from all educational agencies to teach the populace the metric system conversion

Much study and research will be needed before choosing the proper tools, equipment and devices

A lot of planning and organization must be done before starting the change to a metric system

Implementation - a lot of patience must be exemplified and confusion must be dealt with

Change hasn't always brought about progress. Much time is needed for student and teacher orientation.

Identify and choose the most up-to-date metric system before implementation

APPENDIX B

Oklahoma State University

SCHOOL OF OCCUPATIONAL AND ADULT EDUCATION

STILLWATER, OKLAHOMA 74074
CLASSROOM BUILDING 406
(405) 624-6275

March 1, 1978

Thank you for completing the first step of the study to identify problems in implementing metrics as the predominant measurement system in the area vocational-technical schools in Oklahoma. I hope you will continue your assistance by completing correspondence sheet No. 2.

The results of correspondence sheet No. 1 have been compiled, and are reflected in correspondence sheet No. 2. In correspondence sheet No. 2 please respond twice to each of the problems listed. First indicate how frequently you anticipate the problem will occur, and then mark how important the problem is when it does occur. When the results of correspondence sheet No. 2 have been compiled I will forward them to you.

Please return correspondence sheet No. 2 in the enclosed envelope at your earliest convenience.

Sincerely,

Paul McNeary

Paul McNeary

PRM/bh
Enclosures

CORRESPONDENCE SHEET NO. 2

(TO BE ENCLOSED IN RETURN MAIL)

For each problem statement please indicate (1) how frequently you anticipate the problem will occur, and (2) how important each problem is when it does occur. Please circle two (2) responses for each problem.

The problems identified by head administrators reflect the replies received to the following statement included in correspondence sheet No. 1.

As the head administrator for an area vocational-technical school in Oklahoma, I perceive the following problems in implementing metrics as the predominant measurement system in the curriculum of my school as being:

PROBLEMS IDENTIFIED BY HEAD ADMINISTRATORS	RESPONSE 1 Indicate how frequently you anticipate this problem will occur. (very seldom, seldom, sometimes, often, very often)	RESPONSE 2 Indicate the importance of this problem when it does occur. (no importance, slight importance, some importance, quite important, extremely important)
1. Budget considerations for replacing hand tools.	1 2 3 4 5	1 2 3 4 5
2. Budget consideration for replacing major equipment.	1 2 3 4 5	1 2 3 4 5
3. Revision of instructional materials.	1 2 3 4 5	1 2 3 4 5
4. Teachers do not see a need to learn the metric systems.	1 2 3 4 5	1 2 3 4 5
5. The teaching staff is not trained to teach metrics.	1 2 3 4 5	1 2 3 4 5
6. There are no metrics inservice programs for teachers.	1 2 3 4 5	1 2 3 4 5
7. The teaching staff is opposed to adopting metrics in the curriculum.	1 2 3 4 5	1 2 3 4 5
8. No time to incorporate metrics into vocational programs.	1 2 3 4 5	1 2 3 4 5
9. The difficulty of some vocational programs to adapt to metrics.	1 2 3 4 5	1 2 3 4 5
10. Metrics should also be taught in the comprehensive high school.	1 2 3 4 5	1 2 3 4 5
11. Students will have to be taught metrics in elementary schools in order to effectively use the system in high school.	1 2 3 4 5	1 2 3 4 5

(PLEASE COMPLETE REVERSE SIDE)

(continued)

The problems identified by head administrators reflect the replies received to the following statement included in correspondence sheet No. 1.

As the head administrator for an area vocational-technical school in Oklahoma, I perceive the following problems in implementing metrics as the predominant measurement system in the curriculum of my school as being:

PROBLEMS IDENTIFIED BY HEAD ADMINISTRATORS (continued)	RESPONSE 1 Indicate how frequently you anticipate this problem will occur. very seldom / seldom / sometimes / often / very often	RESPONSE 2 Indicate the importance of this problem when it does occur. no importance / slight importance / some importance / quite important / extremely important
12. Teaching metrics to adults in night classes.	1 2 3 4 5	1 2 3 4 5
13. Students resist the metric system because they fear they will not comprehend it.	1 2 3 4 5	1 2 3 4 5
14. Students do not see a need to learn the metric system.	1 2 3 4 5	1 2 3 4 5
15. Students should be trained in the customary system because they will be placed on jobs that use the customary system.	1 2 3 4 5	1 2 3 4 5
16. Lack of on-the-job experience stations for practical application.	1 2 3 4 5	1 2 3 4 5
17. Administrators do not see a need to learn the metric system.	1 2 3 4 5	1 2 3 4 5
18. Planning must be done before starting the change to the metric system.	1 2 3 4 5	1 2 3 4 5
19. The cost to the American people is too great.	1 2 3 4 5	1 2 3 4 5
20. People convert the customary system to the metric system and do not think in the metric system.	1 2 3 4 5	1 2 3 4 5
21. The public does not see a need to learn the metric system.	1 2 3 4 5	1 2 3 4 5
22. People view the change to metrics as having political overtones.	1 2 3 4 5	1 2 3 4 5
23. It is impractical for schools to change before the rest of society changes.	1 2 3 4 5	1 2 3 4 5
24. Industry is not standardizing the products it produces in metrics.	1 2 3 4 5	1 2 3 4 5

APPENDIX C

Oklahoma State University

SCHOOL OF OCCUPATIONAL AND ADULT EDUCATION

STILLWATER, OKLAHOMA 74074
CLASSROOM BUILDING 406
(405) 624-6275

March 20, 1978

Thank you for responding to Correspondence Sheet No. 2 regarding problems in implementing the metric system in area vocational-technical schools in Oklahoma. The results of this are included in Correspondence Sheet No. 3 which is enclosed.

Please review the ranking of the statements in Correspondence Sheet No. 3. If you believe there should be changes in the ranking of these statements, please identify and make these changes. Also, add the reasons for making the changes.

Your cooperation in this study is greatly appreciated. The fourth and last correspondence sheet will be sent to you soon. At the conclusion of this study I will forward a summary of the results to you.

Sincerely,

Paul McNeary

Paul McNeary

PM/kp
Enclosure

CORRESPONDENCE NO. 3

(to be enclosed in return mail)

Listed below are the problem statements on metrics. They are listed according to rank order of importance and frequency as purported by the head area vocational-technical school administrators. Please examine the list and accept the ranking or identify how you believe the items should be rearranged. Additional comments can be placed on the reverse side of this page

---

PROBLEM STATEMENTS - In order of importance and frequency

1. Metrics should also be taught in the comprehensive high school
2. Students will have to be taught metrics in elementary schools in order to effectively use the system in high school
3. The public does not see a need to learn the metric system
4. Planning must be done before starting the change to the metric system
5. People convert the customary system to the metric system and do not think in the metric system
6. Revision of instructional materials
7. The cost to the American people is too great
8. Industry is not standardizing the products it produces in metrics
9. Budget considerations for replacing hand tools
10. Budget considerations for replacing major equipment
11. Students should be trained in the customary system because they will be placed on jobs that use the customary system
12. People view the change to metrics as having political overtones
13. The teaching staff is not trained to teach metrics
14. Students do not see a need to learn the metric system
15. Teaching metrics to adults in night classes
16. Students resist the metric system because they fear they will not comprehend it

17. Lack of on-the-job experience stations for practical application
18. The difficulty of some vocational programs to adapt to metrics
19. It is impractical for schools to change before the rest of society changes
20. Teachers do not see a need to learn the metric system
21. There are no metrics inservice programs for teachers
22. The teaching staff is opposed to adopting metrics in the curriculum
23. Administrators do not see a need to learn the metric system
24. No time to incorporate metrics into vocational programs

FREE RESPONSE COMMENTS TO CORRESPONDENCE

SHEET NO. 3

I agree with the ranking.

The majority of Americans do not want to change, so why are we letting other countries force us to change???

Schools will have to change before society changes.

Planning should proceed before any other.

After planning revision of material to be taught.

Historically, the public schools have enjoyed success because of the tacit approval of the public. Hence, to successfully integrate a change such as this into our curriculum, public acceptance is the first priority. Once this approval is gained, then many barriers listed will fall, i.e., financial problems, teacher acceptance, industry's willingness and so forth.

No major changes necessary, however I seriously question 22 and 23 being as low as they are.

I accept and agree--I am not certain that I can rank above ten items with any degree of accuracy.

The ones I have ruled out are "stupid" statements. [Problem statements numbers 12, 14, 15, 16, 17, 18, 20, 21, 22, 23, and 24 were ruled out on the returned correspondence sheet.]

Much of the ranking is "which came first, the chicken or the egg?" When the public (whoever that is, employers, industry, merchants) see a need the schools will convert.

Prioritized OK by me.

APPENDIX D

Oklahoma State University

SCHOOL OF OCCUPATIONAL AND ADULT EDUCATION

STILLWATER, OKLAHOMA 74074
CLASSROOM BUILDING 406
(405) 624-6275

March 28, 1978

The results from Correspondence Sheet No. 3 regarding problems in implementing the metric system in area vocational-technical schools has been compiled. These results are included in Correspondence Sheet No. 4, which is enclosed. This is the last correspondence sheet.

Thank you for your cooperation on the previous stages of this study. I would appreciate your help with this final aspect of the study. Please complete Correspondence Sheet No. 4 at your earliest convenience.

The problem statements in Correspondence Sheet No. 4 have been listed with the most significant first as ranked by head area vocational-technical school administrators. For each of the problem statements please identify if it is a problem in your school, if the problem can be solved, and if it can be solved recommend how it can be solved.

At the conclusion of the study I will forward a summary of the results to you.

Sincerely,

Paul McNeary

Paul McNeary

PM/kp
Enclosure

CORRESPONDENCE SHEET NO.4
(To Be Enclosed in Return Mail)

The problem statements have been listed with the most significant first as ranked by the head area vocational-technical school administrators. Respond to the problem statements by (1) identifying if you preceive it as a problem in your school by circling yes or no, (2) identifying if you believe it can be solved by circling yes or no, and (3) if it can be solved, briefly recommend how it can be solved.

PROBLEM STATEMENTS	it is a problem in my school	can this problem be solved	recommendations on how this problem can be solved
1. Metrics should also be taught in the comprehensive high school.	yes no	yes no	_____
2. Students will have to be taught metrics in elementary schools in order to effectively use the system in high school.	yes no	yes no	_____
3. The public does not see a need to learn the metric system.	yes no	yes no	_____
4. Planning must be done before starting the change to the metric system.	yes no	yes no	_____
5. People convert the customary system to the metric system and do not think in the metric system.	yes no	yes no	_____
6. Revision of instructional materials.	yes no	yes no	_____
7. The cost to the American people is too great.	yes no	yes no	_____
8. Industry is not standardizing the products it produces in metrics.	yes no	yes no	_____
9. Budget considerations for replacing hand tools.	yes no	yes no	_____
10. Budget consideration for replacing major equipment.	yes no	yes no	_____
11. Students should be trained in the customary system because they will be placed on jobs that use the customary system.	yes no	yes no	_____

(Please Complete Reverse Side)

PROBLEM STATEMENTS	it is a problem in my school	can this problem be solved	recommendations on how this problem can be solved
12. People view the change to metrics as having political overtones.	yes no	yes no	_____
13. The teaching staff is not trained to teach metrics.	yes no	yes no	_____
14. Students do not see a need to learn the metric system.	yes no	yes no	_____
15. Teaching metrics to adults in night classes	yes no	yes no	_____
16. Students resist the metric system because they fear they will not comprehend it.	yes no	yes no	_____
17. Lack of on-the-job experience stations for practical application.	yes no	yes no	_____
18. The difficulty of some vocational programs to adapt to metrics.	yes no	yes no	_____
19. It is impractical for schools to change before the rest of society changes.	yes no	yes no	_____
20. Teachers do not see a need to learn the metric system.	yes no	yes no	_____
21. There are no metrics inservice programs for teachers.	yes no	yes no	_____
22. The teaching staff is opposed to adopting metrics in the curriculum.	yes no	yes no	_____
23. Administrators do not see need to learn the metric system.	yes no	yes no	_____
24. No time to incorporate metrics into vocational programs.	yes no	yes no	_____

Oklahoma State University

SCHOOL OF OCCUPATIONAL AND ADULT EDUCATION

STILLWATER, OKLAHOMA 74074
CLASSROOM BUILDING 406
(405) 624-6275

April 4, 1978

Last week I sent you the fourth and last correspondence sheet concerning metrics. I have not received your response as of today. I would appreciate it if you could spend a few minutes completing that correspondence sheet. I would like to have your responses included in the study.

When the study is completed I will forward a summary of the results to you.

Sincerely,

Paul McNeary

Paul McNeary

PM/kp

VITA

Paul Robert McNeary

Candidate for the Degree of

Doctor of Education

Thesis: THE IDENTIFICATION OF PROBLEMS IN IMPLEMENTING METRICS IN OKLAHOMA'S AREA VOCATIONAL-TECHNICAL SCHOOLS

Major Field: Vocational-Technical and Career Education

Biographical:

Personal Data: Born at Aberdeen, South Dakota, October 4, 1945, the son of Francis and Gertrude McNeary.

Education: Graduated from Central High School, Aberdeen, South Dakota, in 1963; received the Bachelor of Arts degree in Industrial Arts from Northern State College, Aberdeen, South Dakota, in 1967; received the Master of Science in Education degree from Northern State College, Aberdeen, South Dakota, in 1972; completed the requirements for the Doctor of Education degree from Oklahoma State University, Stillwater, Oklahoma, in 1978.

Professional Experience: Industrial Arts Teacher, Picnic Point High School, Sydney, Australia, 1972-1974; Industrial Arts Teacher, Joint Embassy School, Jakarta, Indonesia, 1974-1976; Graduate Assistant, Oklahoma State University, Stillwater, Oklahoma, 1976-1978.

Professional Organizations: Iota Lambda Sigma, Phi Delta Kappa, Epsilon Pi Tau, American Industrial Arts Association, American Vocational Association, Oklahoma Vocational Association, Oklahoma Adult and Continuning Education Association.