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A STATUS STUDY OF MATHEMATICS EDUCATION IN ADULT BASIC EDUCATION

A Dissertation

Presented for the

Doctor of Education

Degree

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Kenneth Scott Ross

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ABSTRACT

The purpose of this study was to determine the current national state-of-the-art in teaching Adult Basic Education (ABE) mathematics and to generate testable hypotheses from data grounded in the results of the survey instruments and the literature of ABE. The teachers and students of the Knox County, Tennessee ABE program were surveyed for this study.

The data were collected from students and teachers who agreed to participate in the study. The data were then analyzed by a computer. Crosstabulations of the responses were done with the demographic data. The review of the literature revealed a paucity of completed research in the area of mathematics education in ABE. It was found that less than one third of the ABE students surveyed had ever used a calculator. The teachers averaged fewer than two adult education courses in their professional preparation. The teachers felt workshops are the most useful source of information about new developments in education.

The main conclusions emerging from the study were that curriculum specialists of both mathematics and Adult Education at the university level have failed to give proper attention to the adequate preparation of teachers who teach mathematics in ABE programs. Federal and state expenditures in ABE have not been used to develop professional incentive plans for teachers in ABE; i.e., professional incentive plans which promise career advancement and security. Passing the General Education Development examination is the primary objective educators teach for rather than developing literacy skills.

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CHAPTER I

INTRODUCTION TO THE STUDY

1.1 Introduction

Adult Basic Education (ABE) is a term which applies to a multitude of adult educational settings. Public Law 88-452, which created the ABE program in 1964, stated that the ABE program was designed to "...instruct adults whose lack of basic educational skills constitutes a substantial impairment of their ability to adapt to and function successfully within contemporary society" (Tennessee ABE Evaluation, 1969). Another purpose of Public Law 88-452 was to eliminate the inability of adults over eighteen years of age to speak and to write the English language so that such individuals would become less dependent on others (Bina and Dowling, 1976). The federal expenditure in 1966 for this program was $32.5 million, and by 1973 the amount had risen to almost $71 million. In that year (1973) Tennessee received $1.5 million for its ABE program, $1.3 million from the federal government and $0.2 million from local and state sources (Adult Basic and Secondary Statistics, 1975).

The Adult Education Act of 1966, Public Law 89-750 defined "Adult Education" as services or instruction below the college level for adults who do not have a certificate of high school graduation. Since 1966 the federal government has devoted large sums to the education of the poorly educated and undereducated adult. These adults have been classified as Level I, a designation which refers to a skill level between the first and eighth grades. Ninth grade and above has been given the

classification of Level II. According to the latest census data one third of the adults in Tennessee do not have a high school diploma, and it has been estimated that 25% of the adults in Tennessee are functionally illiterate, having skill levels in mathematics and communications comparable to or below the fourth grade public school level.

One might think that the ABE teacher would have a fine profession to pursue, considering the potentially large clientele and the large federal expenditures. Unfortunately this is not so. At this point very few states require a special ABE certificate; Tennessee merely requires a valid Tennessee teaching certificate. Kavale and Lindsey state, "Forty years of curricular research has demonstrated the value of the teacher, yet ABE teachers are generally volunteers with training and experience limited primarily to secondary education" (Kavale and Lindsey, 1977, p. 373). Illustrating this part-time aspect of the teachers in Tennessee is the fact that though 821 ABE teachers were employed in 1973, their total employment accounted for a mere 104 full time equivalent teaching positions (Adult Basic and Secondary Statistics, 1975). Since very few professional requirements have been placed on ABE teachers, these individuals tend to have little if any training in Adult Education. Noting that secondary English teachers are teaching mathematics as well as reading, and that secondary mathematics teachers are teaching mathematics as well as reading, it is not surprising that the ABE program has done so little to eliminate illiteracy from the adult population, not only in Tennessee, but in the United States in general.

1.2 Statement of the Problem

As the review of the literature reveals, there are a multitude of problems regarding mathematics instruction in Adult Basic Education. In this study an attempt was made to identify those problems specifically. For example, it was noted in preliminary research for this study that:

1. Teachers of mathematics in Adult Basic Education have no uniform training programs for the teaching of mathematics.
2. There is a paucity of mathematics curriculum materials which are adult oriented and relevant to adult life styles.
3. There is no professional career ladder for ABE teachers, thus little incentive exists to sharpen either content or methodological skills.

1.3 Purpose of the Study

This study sought to accomplish the following tasks:

1. To determine the current Knox County state-of-the-art in teaching ABE mathematics.
2. To generate testable hypotheses from data grounded in the literature of ABE, in the results of survey instruments administered to the ABE teachers and students, and in observations made by this researcher of current ABE instructional practices.

1.4 Importance of the Study

Ken McCullough, Professor of Continuing and Higher Education at the University of Tennessee, Knoxville, and J. B. Bolin, Supervisor of Adult Basic Education in Knox County, Tennessee felt strongly that

a need existed for such a status study. This was confirmed by a search of the literature which revealed almost no research concerned with either mathematics curriculum or teachers of mathematics in ABE. The themes of the ABE literature fell into three groups:

1. political and social policy statements,
2. handbooks for practitioners, and
3. research (very little) dealing with institutionalized subjects (Glass and Hoffman, 1975).

In a project conducted at the University of Missouri, it was noted, "The most singular discovery emerging from the nearly eighteen months of study devoted to this project is how little is known about ABE..." (Spear, 1973, p. 3). A review of the mathematics education journals has revealed that mathematics educators as well as adult educators have seemingly no interest in ABE research. Adult educators are conducting most of their research in areas other than ABE. The following quotation describes the situation properly:

> ...the individual who tries to uncover research based information about ABE ...may have little else at his disposal other than a few smiles, a lot of care and a faint hope (Glass and Hoffman, 1975, p. 58).

1.5 Definition of Terms

1. Adult Basic Education (ABE) is the name of the program developed by federal law in an attempt to eliminate adult illiteracy in the United States.
2. Level I ABE is the academic classification of the ABE student ranging in skill level from the first to the eighth grade.

3. Level II ABE is the academic classification of the ABE student who has attained at least a ninth grade education.
4. ABE mathematics is any of the materials used by the ABE teacher to teach mathematics in either Level I or Level II ABE.
5. Functional illiteracy is the inability of an individual to read and write the English language or perform basic arithmetical operations at a level minimally appropriate in today's society, usually considered a fourth grade equivalency level.

1.6 Delimitations and Limitations of the Study

1. The needs assessment was conducted in the Knoxville/Knox County, Tennessee area; hence it does not necessarily characterize a national population of ABE teachers and students.
2. The review of the literature was limited by what was available in The University of Tennessee Library, the publications of the Tennessee Department of Education, local Knox County ABE material, and publications within the Department of Continuing and Higher Education at The University of Tennessee.

1.7 Methodology

The method used in this study has been named "grounded theory research." This differs from traditional deductive research

(hypothesis-testing research) in that grounded theory is used to formulate concepts, develop hypotheses, and generate theory from the research experience. After the collection of data, hypotheses which can be later tested with empirical research methods are developed from the data analysis. What is important here is that the hypotheses are actually developed from observation of phenomena in the field. They are grounded in the data collected from the group the researcher was interested in rather than modified or adapted from the findings of other researchers. In this study, since it was to be exploratory, the methodology of grounded research outlined by Glaser and Strauss (1967) was used.

1.8 Procedures

The following were the procedures conducted for this research project:

1. A review of the literature was done to determine the state-of-the-art of ABE mathematics at the state and national level. A comparison was then made between the state and national level data and the data found at the local level. The researcher reviewed pertinent journals such as The Journal for the Research in Mathematics Education; Lifelong Learning: The Adult Years; Adult Leadership; the Harvard Educational Review; the National Association for Public Continuing and Adult Education (NAPCAE) Exchange; and The Tennessee Adult Educator within the past ten years. These journals often yielded no pertinent articles.

2. A sample of 5% was selected from the adult student population, and the entire population of the teachers in the Knoxville/Knox County ABE program was studied.
3. The questionnaire administered for the study (see appendix A) was developed by reviewing other mathematical needs surveys as well as through consultations with D. J. Dessart, K. O. McCullough, J. B. Bolin, and Bill Walker, coordinator of the ABE learning lab in Knox County.

1.9 Organization of the Study

The chapters are organized in the following manner:

Chapter I consists of the introduction, the statement of the problem, the purpose of the study, the importance of the study, definition of terms, delimitations and limitations of the study, methodology, procedures, and organization of the study.

In Chapter II the researcher reviewed the literature including the history of ABE before and after the Adult Education Act of 1964. Chapter II also presents ABE teacher characteristics and teacher training as well as the academic characteristics of the typical ABE student. Chapter II ends with a review of curricula and curricular developments in ABE.

Chapter III consists of the design of the survey instrument, procedures for the collection of data, and a description of the participants.

Chapter IV contains the findings of the questionnaire, tables, charts, and other analyses of the data.

The fifth and final chapter contains a summary of the findings, conclusions, implications, and hypotheses which emerged from the data analysis and the literature review. These hypotheses are testable hypotheses and are recommended for future experimental design research.

CHAPTER II

REVIEW OF THE LITERATURE

2.1 History of Adult Basic Education

2.1.1 Definition of Adult Basic Education

What is Adult Basic Education (ABE)? One might first require a definition of adult education and then determine what subset of adult education is ABE. Recently, adult education has been described as the "umbrella" which covers many facets of education for adults. Under this umbrella fall vocational education, community education, continuing education, and of course, Adult Basic Education. Adult education is not one subject per se. It is a process which encompasses all of the specific curricular offerings generally considered adult oriented or primarily attended by adult clientele.

Verner (1964, p. 30) defined adult education this way:

> Adult Education is a relationship between an educational agent and a learner in which the agent selects, arranges, and continuously directs a sequence of progressive tasks that provide systematic experience to achieve learning for those whose participation in such activities is subsidiary and supplemental to a primary productive role in society.

Adult Basic Education, therefore, is a specific program, a subset within the process orientation and learner-centered philosophy of adult education.

The definition given to ABE by the federal government is:

> ABE means education for adults whose inability to speak, read, or write the English language constitutes a substantial impairment of their ability to get or retain employment commensurate with their

> ability and raise the level of education of such individuals with a view to making them less likely to become dependent on others, by improving their ability to benefit from opportunities for more productive and profitable employment and to making them better able to meet their adult responsibilities (Federal Register, XXXII 6277).

ABE fulfills the need to help adults whose difficulty in speaking, reading, or writing the English language impairs their abilities to get or retain employment appropriate to their real abilities (Dean and Lawson, 1980).

2.1.2 Legislative Acts

ABE had its beginning in the moonlight school of 1911 in Kentucky (Cortwright and Brice, 1970). Soon after, Congress made an impact on adult basic education with the passage of the Smith-Hughes Act in 1917 and the Smith-Lever Act of 1914. The first dealt with vocational education, the latter with the rural adult learner (Griffith, 1970).

The work of men such as Frank C. Laubach and Will Lou Gray in the 1920's and of organizations such as the International Ladies Garment Workers Union in the 1930's; the "Private Pete" Army program during World War II; volunteer programs similar to those of the General Federation of Women's Club of the 1950's; the Literacy Council of the 1950's and 1960's contributed to the creation of the framework of current programs (Cortwright and Brice, 1970, pp. 408-409).

There are eight legislative acts related to Adult Basic Education. The Economic Opportunity Act of 1964 (Public Law 88-452) was enacted at a time when there were millions of Americans at the poverty level even

though the United States was considered a rich nation. The Act created the Office of Economic Opportunity whose purpose was:

> ...to initiate programs of instruction for individuals who have attained the age of eighteen and whose inability to read and write the English...(continuing the definition of ABE by the federal government) and making them better able to meet their adult responsibilities (Bina and Dowling, 1976, p. 34).

Warf and Kerr (1969) felt limited funds were its major shortcoming of achieving its goals.

Key provisions of the act included:

1. Grants to states to implement programs with administrative and fiscal control at the state level through state plans;
2. Funds for fiscal years 1965 and 1966;
3. A federal-state funding ratio of 9 to 1 for 1965 and 1966 and 1 to 1 for future years, (not implemented as yet);
4. Individual allotments to each state to be $50,000 per year with total allotment to each state based on the number of individuals 18 years of age and older with no more than five years of schooling.

The expenditure for 1966 was over $32.5 million.

The Economic Opportunity Amendments of 1965 (Public Law 89-253) continued the 9 to 1 funding ratio for 1967 and authorized the use of up to five percent of the funds for teacher training projects. Next came the Adult Education Act of 1966 (Public Law 89-750). Here, "Adult Education" was defined as services or instruction below the college level for adults who did not have a certificate of graduation from a secondary educational institution or an equivalent level of education and who were not currently enrolled in schools. Among other provisions the Adult Education Act of 1966 appropriated $40 million for

1967 and $60 million for 1968. Prohibitions of federal control over the curriculum, program of instruction, administration or personnel of any educational institution or school system were included.

The congressional amendments of 1967 (Public Law 90-247) increased the state allotment to $100,000 and appropriated $70 million for 1969 and $80 million for 1970. This $80 million converted to an average of $86 per student throughout the country.

The major contribution of the Vocational Education Amendment of 1968 (Public Law 90-576) was to reduce the age eligibility from eighteen to sixteen. The Adult Education Act of 1970 (Public Law 91-230) saw a large increase in the federal expenditures for ABE. Two hundred million dollars was appropriated for 1971, and $225 million for both 1972 and 1973. The Educational Amendments of 1972 (Public Law 92-318) provided monies for Indians in 1973, 1974, and 1975.

The Educational Amendments of 1974 (Public Law 93-380) defined "community school program" as a program in which a public building is being used as a community center operated in conjunction with other groups in the community to provide educational, recreational, cultural, and other related services in accordance with the needs, interests, and concerns of that community. Each state was allowed to spend up to 20% of its allotment for institutionalized adults. Fifteen percent can be spent on teacher training, yet there is still no ABE certification. Funding was also reduced by this amendment to $175 million for 1976 and $200 million for 1977 and 1978.

2.1.3 Issues Related to Adult Basic Education

Originally, development of basic knowledge and skills was the goal of ABE in the United States. Today, ABE seems to be taking on more and more responsibilities. Kavale and Lindsey (1977, p. 372) put it best:

> The ABE philosophy has been a mixture of abstract and esoteric goals designed more to charm funding agents and entice support from the academic community than to be translated in concrete programs.

Bina and Dowling (1976) addressed seven issues in their article relevant to Adult Basic Education. These are:

1. What should be the underlying philosophy or purpose of ABE federal legislation?
2. Should the federal government retain the primary funding responsibility for ABE?
3. What should be the criteria for determining the level of federal funding for ABE?
4. Should federal funds be in the form of categorical grants?
5. What should be the time frame for federal funding of ABE?
6. Should federal funds be utilized for the completion of high school by students?
7. What posture should federal ABE legislation adopt with regard to meeting needs of minority groups?

Comments on the seven issues were made by Bina and Dowling. They noted that ABE has become a more comprehensive program dealing with psychology, esteem, and self-actualization of an adult, attributes needed for employment. They also feel that if the 90% funding from the federal government ceased and funding was left up to each state as is the case of other public education, ABE might be one of the first programs to be cut before a youth educational program is cut. Bina and Dowling recommended an alternative to the traditional census type funding, one based on the social and economic cost to the nation resulting from having undereducated citizens.

Currently, the federal government determines the priorities of expenditures, which are usually scheduled over a one- or two-year period. Bina and Dowling felt longer funding periods might provide continuity and the stability necessary for upgrading ABE staff.

According to Bina and Dowling the overall purpose of ABE should be based on the comprehensive needs of adults, including their employment and social skills. Funding should be extended to be based on factors such as social and economic costs. The legislation should be addressing the needs of adults through the twelfth grade and should allow for prompt responses to new educational needs (Bina and Dowling, 1976 p. 62).

2.1.4 Tennessee Adult Basic Education

The Tennessee ABE program as described in the 1969 Tennessee ABE Evaluation is as follows:

> The program of instruction for adults eighteen (now sixteen) years or older whose lack of basic educational skills constitutes a substantial impairment of the ability to adapt to and function successfully within contemporary society (Warf and Kerr, 1969 p. 2).

It is also intended to increase the adult's chance of employment and advancement. A special effort is made to recruit the low income and low achieving adult.

According to Warf and Kerr (1969, p. 12) the objectives of ABE in Tennessee are:

1. To attract students who have completed less than eight grades of schooling.
2. To accept students into the ABE program at their performance levels.
3. To encourage students to adopt higher personal goals, this may extend to GED, even though classes are not organized for this purpose.
4. To attend to the educational needs of ABE students as they raise their personal ambitions and levels of expectancy.

2.2 Teachers

2.2.1 Introuction

The first recorded training program for teachers of illiterate adults was established in Kentucky (Griffith and Hayes, 1970). Most of the original adult education was for the teaching of adults from foreign countries. The first formal adult education teacher training was conducted in Detroit in 1923 by the Detroit Teachers College, which offered a course in "Methods in Teaching Foreign Adults" (Neff, 1970, p. 10). Mattran (1977, p. 259) felt that the general goals of ABE instructional procedure "...must be directed toward alleviating educational deficiencies of significant numbers of undereducated youth and adults."

There is a diverse array of topics researched in ABE: psychological, sociological, instructional, procedural, administrative, developmental, organizational, curricular, and others. No one single adult educator, academician or practitioner has the expertise to address all of the facets of ABE (Jahns, 1970, p. 206). Jahns constructed the following flow chart showing educational outcomes:

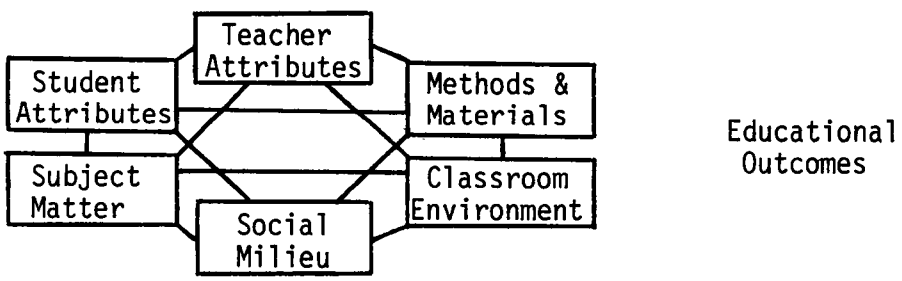


Figure 2.1. Flow Chart of Educational Outcomes.

Source: Jahns, 1970, p. 206.

Neff (1970) stated that the preparation for adult educators involves five steps:

1. Operational definition of the traits of the successful adult education practitioner.
2. The recruitment and selection of candidates for training.
3. Training of the candidates to ensure competence.
4. The orientation of the trained individual to his first professional position.
5. The continuation of training to maintain competence (Neff, 1970, p. 11).

Neff also stated that professional development programs are described by three semi-isolated groups: first, a field of graduate study and the individuals who go through the educational program who may be employed to work in any aspect of the field in Adult Education including Adult Basic Education; second, a derivative of linguistics or English. Personnel who are being prepared to work in ABE get training through English Departments; third, a field of practice, prepared by short-term workshops (Neff, 1970, p. 13).

According to "A Teacher's Guide to Teaching Adult Basic Reading" (University of the State of New York, 1968), getting along with the student is very important. Teachers must understand the personality and psychology of adult students and must establish an atmosphere of trust. This guide also recommends at least 200 hours of instruction at the basic level for the student. According to the guide a teacher must realize that no single approach to the teaching of reading will be adequate for all adults. One must have unique and innovative ideas for the teaching of reading to adults (University of the State of New York, 1968).

The following flow chart was designed to illustrate the process of teaching reading:

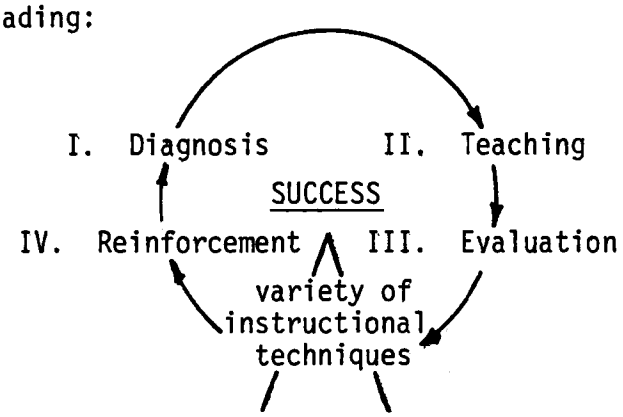


Figure 2.2. Flow Chart for the Success of Reading.

Source: University of the State of New York, 1968.

2.2.2 Research in Adult Basic Education: Teachers

Little research has been done in the area of Adult Basic Education. According to Spear (1973, p. 1):

> The most singular discovery emerging from nearly eighteen months of study devoted to this project is how little is known about teacher training by those most closely associated with it, its supporters, administrators, practitioners and participants.

Research done by Hoffman and Pagano (1971) found that ABE staff training is fragmented and uncoordinated. There is no systematic professional teacher training in any of the federally funded programs. There is also a lack of standard evaluation and statistical reporting procedures. Hoffman and Pagano felt the logical progress of training should be:

counselor aide → counselor assistant → counselor associate → certified ABE teacher

Their model of staff development training has three objectives, they are:

1. Acquaint participants with the diverse agencies available to render assistance to ABE counselors.
2. Give practicum experience with ABE students.
3. Familiarize participants with unique problems of the various minority groups.

Spear recommended that there should be an allocation of funds for the planning of teacher training activities. Various regional staff development centers should be set up to supervise the teacher training activities, to keep financial records, and to maintain data on personnel programs, content, and evaluation. Spear also felt these centers should keep track of all teachers trained, and the type of training they received.

Results from Spear's study of training needs and capabilities of agencies to meet such needs show a difference of opinion among groups about who should formulate objectives for students and the criteria on which those objectives are based. Spear also showed that teachers and administrators differed on the concept of testing students for placement. Teachers felt that full-time teachers are the best ABE teachers, whereas administrators felt that elementary school teachers are the best. Because of the funding of ABE, the ABE teachers are usually part-time, and their ABE classes are an overload from daytime teaching positions.

Spear also found that most ABE programs draw their administrative and instructional staff from the ranks of the traditional public school system, "...while their students are not of that system and indeed may well be rejects of it" (Spear, 1973, p. 13). Spear felt ABE will become truly effective "...only as it ceases to be an appendage of traditional public school education and fields its own corps of full-time, trained

and committed" (Spear, 1973, p. 15). He further recommended that a permanent data bank and retrieval system be established for ABE teacher training. National training centers should be established to provide career education for ABE personnel and for the development of leaders and decision makers in ABE from among minority group members.

There has been research and differences of opinion on certification. Spear (1973) found that administrators thought certification would eliminate good teachers, but teachers felt that it would not. Mettran's (1977) research conflicts with that of Spear. Mettran found that administrators and professors of Adult Education feel there should be ABE teacher certification. Mettran also reported that differences between teachers and administrators were not very large.

Mocker (1974) identified 291 competencies and found there was no significant difference in the way teachers or administrators ranked them. Mocker felt that their perceptions are "homogeneous" concerning teachers' competencies. Both teachers and administrators believed that ABE teachers must have a great range of knowledge to teach classes which have mathematics, reading, science, social studies, and English.

2.2.3 Characteristics of Adult Basic Education Teachers

Cass (1970), in her paper on basic education for adults, listed seven characteristics of teachers that have a positive effect on ABE. These were:

1. Broadmindedness,
2. Experience in many areas under varied conditions,
3. Some amount of travel and contacts with many types of people,
4. Familiarity with the experience of failure or insecurity.

5. Ability to take people at face value,
6. Possession of confidence in their own ability,
7. Awareness of and training in the great difference between the teaching of adults and that of children (Cass, 1970, p. 58).

Cass felt that ABE teachers must have several methods of presenting basic educational skills to adults.

The University of the State of New York (1974) published a guide for "Competency Based Teacher Training in Adult Basic Education" listing the qualities that are more likely to characterize better teachers (better defined in terms of educational gains, changed behavior, and favorable attitudes among students). Successful ABE teachers:

1. Have great empathy, i.e., try to see things as seen by their students.
2. Consistently use reward, seldom, if ever, use punishment and never ridicule.
3. Have a deep sense of their responsibility, enjoy their work and like people.
4. Feel secure in their ability to teach, yet believe they can do better.
5. Have a profound respect for the dignity and worth of each individual and accept their students as they are without reservation.
6. Have a keen sense of failure and maintain objectivity in treating students equally.
7. Are willing to accept or try out new things and ideas and avoid drawing premature conclusions.
8. Have a higher than average level of patience.
9. Recognize the uniqueness and strengths of each individual and build upon such strengths.
10. Are sensitive to the needs, fears, problems, and goals of their students.
11. Derive satisfaction from the growth and development of their students - especially when such changes are dramatic.
12. Reflect on their classroom experience and attempt to analyze them in terms of "why did we accomplish so much tonight," or "why did everything I planned fail to work out?"

13. Are humble in regard to their role as teacher and avoid the use of power which is assumed by some teachers.
14. Do not pretend to have all of the answers and enjoy learning along with the students.
15. Are continuously expanding their range of interests.
16. Are committed to and involved in their own lifelong learning and professional career development (University of the State of New York, 1974, pp. 4-5).

Kavale and Lindsey (1977) found qualitative descriptors of what appears to be a variety of successful teaching methods. The materials found to be effective with illiterate adults are usually teacher-made. However, these researchers also felt there were no data to validate that these methods or materials are pedagogically successful. The studies were rudimentary status studies without research design or statistical treatment, and merely express an opinion by the author.

Specific problems targeted by Tennessee for improvement in teacher training were (1) teachers had not been specifically prepared to teach adults who were functionally illiterate; and (2) there was a high turnover in staff which would indicate that staff instability was probably related to the large number of part-time teachers (Tennessee ABE Evaluation, 1969, p. 17). The 1969 Tennessee ABE Evaluation made some subjective observations that teachers do not prepare lessons carefully, yet the teachers have empathy toward students, and teacher enthusiasm is also abundant. The 1969 Evaluation recommends that a Masters degree in ABE be offered by the major universities in the state.

Kavale and Lindsey (1977) felt that we must devise strategies to develop a significant body of knowledge about the characteristics of illiterate adults and the nature of their reading processes, overcome

obstacles and barriers illiterates face when they return to school and the task of reading, and redefine program variables such as philosophy, competency of teaching personnel, and classroom management styles. They felt there has been too much haste to provide instructional services with inadequate time or money for research and planning. The reasons for this were that reading specialists are more concerned about teaching school children to read, that there were few funds for research in adult reading, and that studies for adult reading have had limited objectives and have used restricted populations. They further stated,

> Forty years of curricular research has demonstrated the value of the teacher, yet ABE teachers are generally volunteers with training and experience limited to secondary education (Kavale and Lindsey, 1977, p. 373).

2.3 Students

2.3.1 Introduction

Each year six thousand new illiterates reach the age of fourteen. Cass (1970) observed:

> Public apathy has led to perfunctory performance in the area of literacy instruction. Adult education programs of a general nature too often have suffered from the lack of broad community support, and in this respect literacy education for adults has been especially unfortunate (Cass, 1970, p. 20).

She also felt that the illiterate adults do not have the same fears as pre-school children (i.e., nonreaders). Therefore adult learning situations should be different so the adults can succeed – they are not children.

The nature of the literature comes in three groups: first, political and social policy statements; second, handbooks for the

practitioner; and third, research. Glass and Hoffman (1975) found much of the literature to be concerned with the urban black learner,

> ...while blacks are proportionally over-represented among ABE learners, whites provide the numerical majority of those needing ABE. The most statistically likely ABE learner is white, rural and middle aged, and will be the least likely to receive scientific attention (Glass and Hoffman, 1975, p. 60).

2.3.2 Characteristics of the Adult Basic Education Learner

In Tennessee the family income of an ABE student is usually less than $10,000 per year (Jones, Bellott, Petry and Bowman, 1980). In 1973 an average of $86 per student was spent nationwide; that average was $106 for the state of Tennessee (Adult Basic and Secondary Statistics, 1975).

The United States has been divided into ten regions for government statistics. The southeast region consists of Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. This region has one third of all students across the nation. Tennessee has approximately 15,000 enrolled in its ABE programs. This was a small percent (1.5%) of the one million with no more than an eighth grade education (Adult Basic and Secondary Statistics, 1975).

Davis and Jones (1976) found that 20% of the adults in the United States are at level I, and 33% are at level II. This means more than half of the population have marginal to inadequate reading and mathematical skills.

2.3.3 Research in Adult Basic Education Students

A study done at the University of Texas found one fifth of the adult population read with difficulty. This was reading for occupational knowledge, consumer economics, government and law, health, community resources, and reading and writing at the fifth grade level. The researchers concluded that there are over 20 million functional illiterates over the age of 25. To be functioning as these 20 million "...is not to be an integrated part of society but a voiceless oppressed underclass" (Mocker, 1978, p. 12). Mocker also felt ABE is often the last chance for "victims" of our school system, yet ABE is no better than traditional youth education. The ABE programs often have the same philosophy and curriculum as elementary schools.

> We need programs to help the illiterates move out of their oppressed state and out of a deterministic, fatalistic view of themselves and their existence. We cannot use teacher dominated and subject matter oriented education, we must have conscious raising education (Mocker, 1978, p. 13).

Why were there so few taking advantage of ABE? Why was there such a high dropout rate? Seaman (1971) felt that the life style of ABE students may be the cause; they are often the "disadvantaged." Seaman felt it is the program, not the student which causes dropouts. He gave five reasons, of which the following is a summation:

1. ABE students are from one parent families (i.e., they are the one parent) and have difficulty attending classes regularly because they cannot leave their children alone.
2. Classes are not located conveniently for the students. Transporation may be a problem, student has no car or bus fares may be too costly.

3. The program is not designed for a mobile population, whereas, the lower socio-economic group tends to be mobile.
4. Class schedules are often too rigid. If a student has a shift change in a job it means he must leave the ABE class.
5. Classes are too large.

The solution offered by Seaman is to take the classes out of the traditional setting and move them into the neighborhood of the ABE student. The traditional classroom has been associated with failure in the past so the student might expect failure again. Classes could be held at Community Colleges or Vocational Schools to add prestige to the program and to encourage the student. Transportation is provided for youth education; Seaman felt it should be provided for adult education.

Seaman (1971) found that according to students, they were being recruited into ABE without being adequately informed about what the program can provide for them. Other students felt the programs do not provide sufficient job related training. Seaman found the student felt the material was too childish and uninteresting. Seaman (1971, p. 12) stated: "Teachers appear disinterested in their students, probably because most have put in a full day of teaching in public school."

Conflicting with Seaman were the results of the ABE National Teacher Training Study (1973) which found teachers do appear interested in their students. The study also found students (who attend) had a more positive attitude about the ABE program than their teachers had about the program. The students felt that subject matter competence in the teacher is most important. The National Teacher Training Study also found that students prefer to work at an individual rate but with traditional patterns of classroom organization.

Kavale and Lindsey (1977) found that adults with learning disorders often enroll in ABE classes. Adults, like children, have different rates of cognitive growth due to differing backgrounds.

Glass and Hoffman (1975) found most research had been done on institutionalized adults within hospitals or correctional institutes due to the ease of accessibility of subjects. Glass and Hoffman (1975, p. 58) observed: "...the individual who tries to uncover research based information about ABE learners may have little else at his disposal than a few smiles, a lot of care, and a faint hope."

The Tennessee ABE Evaluation (1969) found that one reason for drop-out was the objectives of the program are not always the same as the students' objectives. The program in Tennessee is a lock-step progression. This lock-step progression does not fill the needs of all students. The Tennessee ABE Evaluation (1969, p. 10) concluded that "...the number of students in the program relates directly to the amount of money available."

It is clear the ABE program was designed to provide educational opportunities to adults who have not acquired the basic communication and computational skills. By this definition there are over 25 million adults in need of basic education (Seaman, 1971). Seaman (1971, p. 2), also felt, "Every student who enrolls in an ABE program is a human being whose needs, interests, and goals are nearly the same as those of any other person." ABE tries to fulfill these needs.

2.4 Curriculum

2.4.1 Introduction

As in the other areas of ABE, very little research has been done relative to ABE curriculum. McGee (1978) felt that the teacher is the most important resource in adult education,

> ...of greater concern, however, is the lack of a wide selection of relevant and innovative instructional materials for teachers' use. Often teachers have no choice but to use traditional materials that are designed for grades K-12 (McGee, 1978, p. 24).

In 1965 adult literacy was proceeding very slowly. Then ABE was launched. Kavale and Lindsey (1977, p. 368) gave three reasons for its failure:

1. Quantitative and qualitative descriptors in the literature were misleading.
2. Studies of major program variables provided little empirical data to justify approaches used.
3. The literature contained few research studies generating new knowledge about the nature of the illiterate's reading process.

Cass (1970, p. 70) felt the purpose of the ABE curriculum was "...to provide a functional program of instruction, to provide training opportunities to help adults enrich their own lives and become participating members of the community."

2.4.2 Research in Adult Basic Education Curriculum

Lopez and Smith (1977) studied and evaluated ABE in Illinois. The study was designed to improve the administrative and programmatic aspects of public adult and continuing education (especially ABE) in Illinois. Eight aspects were appraised:

1. curriculum and instruction,
2. intra-institutional relationships,
3. extra-institutional relationships,
4. professionalism,
5. evaluation and follow-up,
6. physical facilities,
7. efficiency and accountability, and
8. support services.

Their findings were that few curricula were developed with satisfactory input from the community instructional and support staff, students and the director. The use of children's materials had disappeared; however, insufficient effort is put forth to ensure that promotion, orientation, instruction, and counseling take into account the unique nature of the adults as learners. Lopez and Smith also found inadequate guidance services provided and an ineffectiveness of workshops designed to disseminate information. Another problem was that success has been measured in terms of attendance and a percentage of those who pass the GED. This does not take into account students' progress toward specific goals other than that of the GED.

Hall and Coley (1975) found that much of the teaching of reading was done by people having little preparation in the teaching of reading to adults. Hall and Coley (1975, p. 103) also observed:

> Most reading authorities have not devoted much attention to reading instruction for the illiterate. Consequently, much reading instruction in Adult Basic Education has been lacking in a knowledge base about the nature of reading, and much information about teaching procedures which could be useful is untapped.

A teacher of reading must know how to teach vocabulary development, comprehension, and word attack skills as well as have a number of relevant techniques at his or her command.

Snyder (1971) felt a need to shift from the teaching of basic literacy skills to the teaching of survival skills in society. According to Snyder there are ten stages of Havighurst's life stages related to the ABE student and must be accounted for in the curricula. The ten life stages are: parent, spouse, child of an aging parent, homemaker, worker, user of leisure time, church member, citizen, club member, and friend. Coping with these should be the goal of ABE.

Snyder also felt the individual teacher that screens all influencing factors through his own philosophy converts a curriculum for the learner based on that philosophy. "The teacher is the most influential element in deciding the areas of emphasis to be included in the instructional process under his direction" (Snyder, 1971 p. 6). Snyder felt the teacher should be most aware of the needs of the learner and recommends that teachers use the following nine (Gagne) events of instruction:

1. gaining and controlling attention,
2. informing the learner of expected outcomes,
3. stimulating recall of relevant prerequisite capabilities,
4. presenting the stimuli inherent in the learning task,
5. offering guidance for learning,
6. providing feedback,
7. appraising performance,
8. making provisions for transferability (transfer to real life situations), and
9. insuring retention.

Snyder made recommendations for the teacher and all other personnel in ABE to improve the ABE program. The following is a summary of those recommendations: At the community level teachers should identify the goals being sought through the ABE instructional

process by staying current with readings on ABE. The teacher should utilize local services for various learning activities. Snyder also felt the teacher should share any helpful information with other local teachers and administrators. The local directors should stay current on local conditions, problems, and needs. Snyder felt directors should be involved in development of curricular guides and other instructional material as well as directing the local ABE program toward a successful future.

Snyder felt that at the state level evalution of ABE programs should be conducted and that the information obtained should be disseminated to the local ABE programs. He also felt the state university and college personnel should establish firm links with state level ABE staff members and serve as technical assistants to curricular groups, especially in the areas of instruction and learning theory.

Finally, at the national level, the U.S. Office of Education should issue reports on special research about ABE and increase grants for such research. This research can be a survey of the states' focus on the improvement of ABE and carried out by professional adult education organizations (Snyder, 1971, pp. 18-20).

CHAPTER III

DESIGN OF INSTRUMENTS, DATA COLLECTION PROCEDURES, AND DESCRIPTION OF PARTICIPANTS

3.1 Design of the Instruments

The development of the instruments emerged from a synthesis of various instruments for determining a needs assessment, including a needs assessment of ABE students at Lewis and Clark Community College (1976) and the 1980 Statewide Evaluation of ABE in Tennessee. The instrument for the students needs assessment for ABE in Knox County (see Appendix A) began with questions concerning the demographics of the students, including characteristics such as sex, age, marital status and highest educational grade completed. The next group of questions dealt with the students' use of mathematics in everyday life, uses which included the last time the students calculated their paychecks, calculated the miles per gallon (MPG) for their cars, used a calculator, or balanced a checkbook. This was followed by a question of the students' perceptions of their understanding of twelve mathematical concepts: addition, subtraction, multiplication and division with whole numbers and fractions, ratios and proportion, percentage, word problems, and algebra. The final section of the assessment was Aiken's Mathematics Attitude Scale (MAS). This scale was developed by Aiken (1972) to measure how the appreciation and use of mathematics, including recognizing the importance and relevance of mathematics to the individual and society, and enjoyment related to: 1) achievement, 2) individual difference in personality, 3) attitudes and abilities of parents and teachers.

The reliability and validity of the MAS vary with grade level. Aiken reported the scale is more reliable and valid in high school and college because "...attitudes become more stable with maturity, but the degree of self-insight and conscientiousness with which students can express their attitudes, increases with age" (Aiken, 1972, p. 230). Aiken also observed that mathematics achievement is positively correlated with interest in mathematics. Aiken used attitude synonymously with enjoyment or interest.

The instrument for the assessment of the teachers of ABE in Knox County (see Appendix A) included demographic data pertaining to their teaching and academic backgrounds, including the levels they taught in public schools (i.e., elementary, middle, or secondary) and the number of years that they had taught. Other demographic data included highest degree attained, the number of college level mathematics courses taken, and the number of adult education courses taken.

One question dealt with the teachers' perception of problems in ABE mathematics including such factors as 1) the importance of mathematics as relative to other subjects, 2) adequacy of facilities, 3) out-of-date teaching materials, 4) lack of student interest in mathematics, and 5) adequacy of student reading abilities. Another question asked the teachers to identify the areas in which they would like assistance from a mathematics educator, including lesson planning, learning new teaching methods, obtaining subject matter information and the use of calculators. Question sixteen dealt with the use of different teaching techniques used by the teachers, including lecture, discussion, tests and other activities.

Question seventeen asked the teachers to identify how difficult it is for them to teach certain mathematical concepts. The concepts were addition, subtraction, multiplication, and division with whole numbers and fractions, ratio and proportion, percentage, word problems, and algebra.

Aiken's MAS also was administered to the teachers. Aiken (1972, p. 232) reported, "Teachers attitude and effectiveness in mathematics are viewed as being prime determiners of student's attitudes and performances in the subject." Aiken also felt the degree of teacher understanding, effectiveness, and appreciation of mathematics are significantly related to student attitude.

3.2 Procedures for the Collection of Data

All of Knox County's eighty classes were visited, with the exception of the jail classes, the penal farm classes, classes for cerebral palsy victims, classes at Lakeshore Mental Health Center, and classes at nursing homes. One hundred thirty students agreed to participate in the study, a number which represented 5.4% of the study population. They signed letters of consent; all data were kept anonymous.

The teachers were surveyed during a Saturday morning workshop, at which all but one of the instructional staff were present. Fortunately, all of the staff who were present agreed to participate in the study. The purpose of the study was explained to these teachers, and all signed the consent forms. As with the students' data, teachers' data were kept anonymous.

3.3 Procedures for Analysis of Data

The UTK computing facilities were used to process the data. The data were transformed into relative frequencies and the mean, mode, and standard deviations were determined for each question.

A further analysis of the data was done by crosstabulations. The demographic data were cross-analyzed with the other questions. The analysis was done to determine if a relationship existed between the demographic categories and the responses to the other questions. Chi-Square Distribution was used to determine if a relationship existed between the different responses for the different demographic divisions.

The null hypothesis for all pairs of variables cross-analyzed was that there was no difference between the proportions of the two variables. The null hypothesis would be rejected if the observed proportions deviated from the expected proportion by less than five percent ($p < .05$). The Chi-Square test of difference between proportions is defined by

$$\chi^2 = \frac{n(AD - BC)^2}{(A+B)(C+D)(A+C)(B+D)}$$

where: n = the number of observations and A, B, C and D are the values from the contingency table

A	B
C	D

(A+B) = row sums
(C+D) = row sums
(A+C) = column sums
(B+D) = column sums

This can be extended to (nxm) contingency table according to Q. McNemar, Psychological Statistics, 1969.

3.4 Description of Participants

3.4.1 Students

Sixty-three percent of the student participants were female. The average age of the ABE student was 29.26 years with almost half (47.6%) less than twenty-five years of age. One fifth had been divorced, while another 39.3% had never been married. The highest completed grade level averaged 10.18 with 30.8% having completed 9 years of school or less. More than one fifth (20.8%) had completed high school.

3.4.2 Teachers

Seventy-three percent of the teachers were female. One third were high school teachers, but over 40% worked in various kinds of special education. The teachers averaged 6.1 years of teaching experience with a range from one to forty-six years of experience. Their years of experience with ABE ranged from one to fourteen. The average number of mathematics courses taken at the college was 2.5 with 41.3% having one or no courses. The average number of adult education courses taken was 2.2 with 57.1% having one or no adult education courses. There was one Ph.D, one J.D., and one Ed.S. Forty-two point nine percent held the masters degree. The remainder had bachelors degrees.

CHAPTER IV

DATA ANALYSIS

4.1 Introduction

This chapter will present the data obtained from the students' and teachers' questionnaires. The relative frequencies of the responses and the appropriate means of the demographic data will also be presented. The results on the tables may not sum to 100 percent due to incomplete returns.

The analyses of crosstabulations were done using the Chi-Square Distribution with the Chi-Square Test for difference between proportions used to determine if a relationship existed between the different demographic divisions. Significant crosstabulation ($p < .05$) will be reported with hypotheses generated in this study reported in Chapter Five.

Crosstabulations of the students' responses were done with:

1. sex by: age, marital status, highest grade completed, questions seven, eight, ten, and eleven, and Aiken's Mathematics Attitude Scale (MAS) score.
2. age by: marital status, highest grade completed, questions seven, eight, ten, and eleven, and Aiken's MAS score.
3. marital status by: highest grade completed, questions seven, eight, ten, and eleven, and Aiken's MAS score.
4. highest grade completed by: questions seven, eight, ten, and eleven, and Aiken's MAS score.

Crosstabulations with the teachers' responses were done with:

1. sex by: teaching level, years teaching, years teaching in ABE, number of mathematics courses taken, number of

adult education courses taken, and questions nine, ten, eleven, twelve, fifteen, and seventeen.

2. teaching level by: years teaching, years teaching in ABE, number of mathematics courses taken, number of adult education courses taken, and questions nine, ten, eleven, twelve, fifteen, and seventeen.
3. number of mathematics courses taken by: number of adult education courses taken, and questions nine, ten, eleven, twelve, fifteen, and seventeen.
4. number of adult education courses taken by: questions nine, ten, eleven, twelve, fifteen, and seventeen.
5. highest degree attained by: questions nine, ten, eleven, twelve, fifteen, and seventeen.

4.2 Analysis of Data

4.2.1 Students

The demographic results of the students' questionnaire showed that 62.8% of the students were female and 37.2% were male. The ages ranged from 18 to 65 with an average of 29.26 years of age. Almost half (47.6%) were 18-25 years of age, 29.8% were 26-35 years of age, 13.7% were 36-45 years of age, 6.5% were 46-55 years of age, and 2.4% were older than 55. The average highest grade completed was 10.18 years with 14.2% with eight years or less. The remaining students were divided as follows: 16.7% had completed nine years of school; 25.8% had completed ten years; 22.5% had completed eleven years;

15.0% had completed twelve years; and the remaining 6.7% had some college experience.

According to the results of question seven (Table 4.1), which asked for evaluation of the usefulness of various sources, the students felt that teachers were the most useful source in their mathematics learning. This was followed by texts and workbooks. Question eight referred to the frequency that the students read newspapers. The results were that 38% read a newspaper daily, 35% read a newspaper weekly, and 11% read a newspaper monthly. This left 16% who failed to answer the question or never read a newspaper.

Question Ten (Table 4.2), which required students to identify the last time they had performed various mathematical tasks, revealed that many students have never calculated their paychecks, the miles-per-gallon for their cars, or balanced their checkbooks. One should also observe that almost one third (31.5%) have never used a calculator.

Question eleven (Table 4.3), which asked how well the student understood various mathematical concepts, showed a vast majority of the students felt competent in computational skills with whole numbers. Approximately one-half felt very competent in computational skills with fractions. However, the percentage dropped when students were asked about competence in ratio and proportion, percentage, and word problems. Only a small percentage indicated that they understood those skills very well.

A review of the students' responses to Aiken's Mathematical Attitude Scale (Table 4.4) revealed only 11.8% of the students agreed or strongly agreed with statement No. 2 which is: "I do not like

Table 4.1. Results From Student's Needs Assessment, Question 7: "Indicate how useful each of the following sources are for your work in mathematics."

	PERCENT FREQUENCY		
	Not Useful	Somewhat Useful	Very Useful
Teachers	4.7	9.4	85.8
Texts and Workbooks	5.6	22.4	72.0
Friends or Relatives	22.7	41.8	29.5

Table 4.2. Results From Student's Needs Assessment, Question 10: "Indicate the last time you ...."

	PERCENT FREQUENCY		
	Last Week	Last Month	Never
Helped one of your children in mathematics	23.1	16.2	25.6
Calculated your paycheck	33.9	15.0	22.0
Calculated the MPG for your car	13.9	23.0	38.5
Estimated the cost for four or less items bought at a store	56.7	13.4	19.7
Read your electric meter	7.3	14.6	67.5
Used a calculator	27.6	26.8	31.5
Filled out your income tax form	2.3	20.3	54.7
Balanced your checkbook	19.5	16.3	38.2
Calculated the interest on a loan or major purchase	10.2	17.2	55.5

Table 4.3. Results From Student's Needs Assessment, Question 11: "Indicate how well you understand each of the following mathematical concepts."

	PERCENT FREQUENCY		
	Very Well	Fairly Well	Not Well
Addition with whole numbers	78.5	20.0	1.5
Subtraction with whole numbers	78.5	20.8	0.8
Multiplication with whole numbers	74.4	24.8	0.8
Division with whole numbers	66.9	26.9	6.2
Addition with fractions	56.9	32.3	10.8
Subtraction with fractions	55.8	31.0	13.2
Multiplication with fractions	48.4	35.9	15.6
Division with fractions	40.6	35.2	24.2
Ratio and proportion	11.9	32.5	55.6
Percentage	15.6	48.4	35.9
Word problems	12.6	43.3	44.1
Algebra	6.3	25.8	68.0

Table 4.4. Results From Student's Needs Assessment of: Aiken's Mathematics Attitude Scale.

		PERCENT FREQUENCY				
		SD	D	U	A	SA
1.	I am always under a terrible strain in a mathematics class.	26.3	39.0	16.1	14.4	4.2
2.	I do not like mathematics, and it scares me to have to take it.	36.4	39.0	12.7	7.6	4.2
3.	Mathematics is very interesting to me, and I enjoy arithmetic and mathematics courses.	6.8	16.9	10.2	45.8	20.3
4.	Mathematics is fascinating and fun.	9.5	19.0	18.1	37.9	15.5
5.	Mathematics makes me feel secure, and at the same time it is stimulating.	11.3	16.5	20.9	41.7	9.6
6.	My mind goes blank and I am unable to think clearly when working mathematics.	17.8	49.2	11.9	15.1	5.1
7.	I feel a sense of insecurity when attempting mathematics.	13.8	46.6	9.5	25.9	4.3
8.	Mathematics makes me feel uncomfortable, restless, irritable, and impatient.	19.1	47.0	11.3	17.4	5.2
9.	The feeling that I have toward mathematics is a good feeling.	9.5	15.5	16.4	50.9	7.8
10.	Mathematics makes me feel as though I'm lost in a jungle of numbers and can't find my way out.	18.3	47.0	12.2	16.5	6.1
11.	Mathematics is something I enjoy a great deal.	7.8	20.7	13.8	50.9	6.9
12.	When I hear the word mathematics, I have a feeling of dislike.	12.8	56.4	12.0	13.7	5.1

Table 4.4. Continued.

	PERCENT FREQUENCY				
	SD	D	U	A	SA
13. I approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics.	18.8	41.9	7.7	23.1	8.5
14. I really like mathematics.	9.5	14.7	11.2	54.3	10.3
15. Mathematics is a course in school that I have always enjoyed studying.	11.0	24.6	8.5	44.9	11.0
16. It makes me nervous to even think about having to do a mathematics problem.	19.7	49.6	11.1	13.7	6.0
17. I have never liked mathematics, and it is my most dreaded subject.	22.9	49.2	11.0	7.6	9.3
18. I am happier in a mathematics class than in any other class.	14.4	30.5	19.5	30.5	5.1
19. I feel at ease in mathematics, and I like it very much.	10.2	19.5	16.9	47.5	5.9
20. I feel a definite positive reaction toward mathematics; it's enjoyable.	8.7	18.3	20.0	47.8	5.2

mathematics and it scared me," while 75.4% disagreed with it. Another question revealed that 53.4% found mathematics fascinating and fun, and 28.5% did not. Over all, the responses to Aiken's MAS showed more than half of the students enjoyed mathematics and had a positive attitude toward it.

4.2.2 Teachers

The demographic results from the teachers' questionnaire revealed that 73% of the teachers were female and 27% were male. The average number of years teaching was 6.1 with 19.2% of the teachers having one year of experience, 9.6% two years, 21.2% with three years, and the remaining 50% with a range from four to forty-six years of teaching experience. The average number of years teaching in ABE was 4.46, with 28.6% with one year of experience, 11.1% with two years, 12.7% with three years, 12.7% with four years, and the remaining 34.9% with five to fourteen years of experience with ABE.

The average number of mathematics courses taken at the college level was 2.5 with 41.3% having one or none, 52.4% with two to five, and 6.4% with six or more mathematics courses at the college level. The average number of adult education courses taken was 2.2, with 57.1% having had one or none, 31.7% with two to five and 11.1% with six or more adult education courses.

The teachers' responses to question nine (Table 4.5) showed that they find other teachers and workshops most useful as a source of information about new developments in education. The results of question ten (Table 4.6) which requested how qualified the teacher felt about teaching mathematics, science, social studies and reading, showed most teachers felt adequately to very well qualified to teach these

Table 4.5. Results From Teacher's Needs Assessment, Question 9: "As a source of information about new developments in education, how useful do you find each of the following?"

	PERCENT FREQUENCY		
	Not Useful	Somewhat Useful	Very Useful
Other teachers	4.8	40.3	54.8
Supervisors	6.5	54.8	38.7
College courses	10.0	45.0	45.0
Local in-service or workshops	8.1	41.9	50.0
Journals and other publications	12.9	58.1	29.0
Professional meetings	13.8	51.7	34.5

Table 4.6. Results From Teacher's Needs Assessment, Question 10: "How qualified do you feel to teach each of the following?"

	PERCENT FREQUENCY		
	Not Well Qualified	Adequately Qualified	Very Well Qualified
Mathematics	9.7	66.1	24.2
Science	22.6	54.8	22.6
Social Studies	3.2	59.7	37.1
Reading	9.7	46.8	43.5

subjects. One should observe that nearly ten percent do not feel qualified to teach mathematics or reading.

Question eleven (Table 4.7) revealed teachers felt that inadequate student reading ability is a serious problem affecting instruction in ABE. Other problems that teachers felt affected mathematics instruction were teachers inadequately prepared to teach mathematics and lack of student interest in mathematics. Question twelve (Table 4.8) which requested the teachers needs from a mathematics educator, provided information that could be used at future in-service programs. Almost 44% of the teachers would like, but receive little or no assistance in learning new teaching methods and obtaining subject matter information. One should also observe that 84.9% stated that they do not need assistance using calculators, yet 31.5% of the students had responded that they had never used a calculator.

Question fifteen is: "Which of the following best indicates the way concepts related to the metric system are being used in your class?" Twenty-three percent responded that metrics are not included in the course; 39% stated that metrics were introduced as a special unit, then seldom used during the remainder of the course. Twenty-eight percent introduced metrics as they needed the subject and only ten percent introduced metrics as a special unit and used the metric system throughout the course.

Individual assignments and classroom discussion were the two most common techniques used by mathematics teachers in their classrooms, as shown by the responses to question No. 16 (Table 4.9). One should

Table 4.7. Results From Teacher's Needs Assessment, Question 11: "The following factors may affect mathematics instruction in the ABE program as a whole. In your opinion, how much of a problem is caused by each of the following?"

	PERCENT FREQUENCY		
	Serious Problem	Somewhat of a Problem	Not a Significant Problem
Belief that mathematics is less important than other subjects	6.5	24.2	69.4
Inadequate facilities	1.6	37.1	61.3
Lack of materials for individualizing instruction	17.7	32.3	50.0
Out-of-date teaching materials	9.8	27.9	62.3
Insufficient number of texts	8.2	26.2	65.6
Lack of student interest in mathematics	21.0	43.5	35.5
Inadequate student reading abilities	48.4	51.6	0.0
Teachers inadequately prepared to teach mathematics	13.1	62.3	24.6
Not enough time to teach mathematics	11.1	24.2	64.5

Table 4.8. Results From Teacher's Needs Assessment, Question 12: "Please indicate your needs regarding assistance from a mathematics education resource person for each of the following."

	PERCENT FREQUENCY		
	Usually Do Not Need Assistance	Would Like but Receive Little or No Assistance	Would Like and Receive Adequate Assistance
Establishing instructional objectives	77.6	10.3	12.1
Lesson planning	84.5	8.6	6.9
Learning new teaching methods	33.3	43.9	22.8
Actually teaching lessons	77.2	12.3	10.5
Obtaining subject matter information	50.9	29.8	19.3
Using calculators	84.9	9.4	5.7

Table 4.9. Results From Teacher's Needs Assessment, Question 16: "How often do you use each of the following techniques in teaching mathematics to your class?"

	PERCENT FREQUENCY			
	Never	Less Than Once A Month	At Least Once A Month	At Least Once A Week
Lecture	43.1	19.6	13.7	23.5
Discussion	5.9	5.9	15.7	72.5
Library work	79.6	12.2	4.1	4.1
Tests or quizzes	14.0	22.0	44.0	20.0
Individual assignments	4.1	4.1	2.0	89.8
Quest speakers	79.6	16.3	2.0	2.0

observe that 23.5% lecture once a week. Yet it is highly recommended by educators in the ABE teacher training programs that all instruction be individualized.

As with the students' question eleven, teachers' question seventeen (Table 4.10), which requested how difficult it is to get various mathematical concepts across to their students, showed a vast majority of the teachers have no difficulty teaching the concepts of computational skills with whole numbers to their students. However, as one moves toward computation with fractions, a number of teachers have difficulty teaching those concepts, this corresponds to the students' understanding of these concepts. A majority of the teachers found it somewhat to very difficult to teach ratio and proportion, percentage, and word problems. These were the concepts the students understood the least. The teachers' response to Aiken's Mathematics Attitude Scale (Table 4.11) shows an overwhelming majority (80-90%) felt good about mathematics. The responses revealed 80.6% of the teachers disagreed or strongly disagreed with the statement: "I do not like mathematics and it scares me to have to take it." Another response revealed 72.5% had a good feeling toward mathematics. However, 29% disagreed or strongly disagreed with the statement: "I feel a definite positive reaction toward mathematics; it's enjoyable."

4.3 Analysis of Crosstabulations

4.3.1 Students

A crosstabulation of sex with marital status showed a significant difference ($p < .05$) existed. The female students had a much higher divorce rate than did the male students. Question seven, part c, which

Table 4.10. Results From Teacher's Needs Assessment, Question 17: "How difficult is it for you to get these mathematical concepts across to your students?"

	PERCENT FREQUENCY		
	Not Difficult	Somewhat Difficult	Very Difficult
Addition with whole numbers	98.1	1.9	0.0
Subtraction with whole numbers	90.4	9.6	0.0
Multiplication with whole numbers	82.7	13.5	3.8
Division with whole numbers	71.2	23.1	5.8
Addition with fractions	68.6	25.5	5.9
Subtraction with fractions	62.7	27.5	9.8
Multiplication with fractions	64.7	23.5	11.8
Division with fractions	47.1	39.2	13.7
Ratio and proportion	30.6	38.8	30.6
Percentage	18.0	62.0	20.0
Word problems	19.6	41.2	39.2
Algebra	26.1	47.8	26.1

Table 4.11. Results From Teacher's Needs Assessment of: Aiken's Mathematics Attitude Scale.

		PERCENT FREQUENCY				
		SD	D	U	A	SA
1.	I am always under a terrible strain in a mathematics class.	48.4	43.5	1.6	3.2	3.2
2.	I do not like mathematics, and it scares me to have to take it.	53.2	27.4	9.7	6.5	3.2
3.	Mathematics is very interesting to me, and I enjoy arithmetic and mathematics courses.	4.8	19.4	4.8	45.2	25.8
4.	Mathematics is fascinating and fun.	3.2	16.1	8.1	50.0	22.6
5.	Mathematics makes me feel secure, and at the same time it is stimulating.	3.2	22.6	19.4	38.7	16.1
6.	My mind goes blank and I am unable to think clearly when working mathematics.	41.9	46.8	8.1	0.0	3.2
7.	I feel a sense of insecurity when attempting mathematics.	41.0	44.3	1.6	11.5	1.6
8.	Mathematics makes me feel uncomfortable, restless, irritable, and impatient.	43.5	41.9	3.2	9.7	1.6
9.	The feeling that I have toward mathematics is a good feeling.	1.6	17.7	8.1	51.6	21.0
10.	Mathematics makes me feel as though I'm lost in a jungle of numbers and can't find my way out.	38.7	46.8	8.1	4.8	1.6
11.	Mathematics is something I enjoy a great deal.	4.9	21.3	8.2	45.9	19.7
12.	When I hear the word mathematics, I have a feeling of dislike.	39.3	37.3	8.2	13.1	1.6

Table 4.11. Continued.

		PERCENT FREQUENCY				
		SD	D	U	A	SA
13.	I approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics.	38.7	45.2	4.8	4.8	6.5
14.	I really like mathematics.	3.3	13.1	18.0	45.9	19.7
15.	Mathematics is a course in school that I have always enjoyed studying.	4.8	32.3	8.1	38.7	16.1
16.	It makes me nervous to even think about having to do a mathematics problem.	43.5	45.2	3.2	6.5	1.6
17.	I have never liked mathematics, and it is my most dreaded subject.	46.8	35.5	3.2	12.9	1.6
18.	I am happier in a mathematics class than in any other class.	12.9	35.5	29.0	16.1	6.5
19.	I feel at ease in mathematics, and I like it very much.	4.8	22.6	6.5	54.8	11.2
20.	I feel a definite positive reaction toward mathematics; it's enjoyable.	4.8	24.2	8.1	50.0	12.9

requested how useful friends or relatives are for giving assistance with mathematics showed no difference between sexes. There was, however, a significant difference for the responses to question 10, part a. Female students helped their children in mathematics significantly ($p < .02$) more than did male students. Part c of the same question revealed that men calculated the MPG for their car significantly ($p < .02$) more often than women. Women balanced their checkbooks significantly ($p < .005$) more often than men, and the data tends to show female students may use calculators more often.

Question eleven, which requested how well the student understood various mathematical concepts revealed men understood ratio and proportion significantly ($p < .001$) better than women. Men also tended to understand percentage and word problems better than women.

The results of the crosstabulation of students' sex crossed with Aiken's Mathematics Attitude Scale showed men tended to enjoy mathematics more than women enjoyed mathematics. Reviewing the results, one finds one-third of the female students disliked mathematics and felt insecure with it. Fifteen percent were undecided, and the remaining half-liked mathematics. The distribution for men over Aiken's Mathematics Attitude Scale showed that two-thirds liked mathematics, fifteen percent were undecided, and fifteen percent disliked mathematics.

Crossing age with marital status showed the younger students (18-25) had the highest percentage of being single (56.4%). Only 24.2% of the 26-35 year olds were single, 13% of the 36-45 year olds, and 28.6% of the 46-55 year olds were single. The average of the highest grade completed was uniform with respect to age. The average for the

18-25 year olds was 10.2 years of school completed; for the 26-35 year olds the average was 10.1 years of school. The 36-45 year olds averaged 10.6 years of school, the 46-55 year olds averaged 11.1 years of school, and students 55 years of age and older averaged 7.0 years completed.

The younger students (18-25) tended to calculate their MPG for their car more often than the older students. However, the older students estimated the cost of a few items more often. Only 53% of the 18-25 year olds had estimated the cost of a few items in the last week. This was 76-100% for the other age groups. Fifty percent of the 18-25 year olds had never balanced a checkbook. Age was also a factor in the Aiken's Mathematics Attitude Scale. The older students (45-over) tended to enjoy mathematics more than the 18-25 year olds.

Crossing highest grade completed with question ten revealed the students with 9-11 years of schooling calculated their paycheck more often than the other students. There was no difference between grade level and the students' understanding of computation with whole numbers. However, the students with ten or more years of schooling understood ratio and proportion problems significantly better ($p < .01$) than the students with fewer than ten years of school.

The crosstabulation with highest grade completed and Aiken's Mathematics Attitude Scale revealed the students with 9-11 years of schooling felt unable to think clearly when working mathematics problems significantly more often ($p < .01$) than the other students. The same group (9-11) also felt least comfortable and restless toward mathematics significantly more often ($p < .01$) than the other students.

4.3.2 Teachers

The difference in the way male and female teachers answered the questionnaire was evident in that men felt significantly ($p < .05$) more qualified to teach science than did women teachers. There was no difference in their responses to teaching word problems. All found it very difficult. The male teachers averaged 6.3 years of teaching; the female teachers averaged 6.0 years of teaching. The average number of years teaching in ABE was 3.6 for the men and 4.9 for the women. The men averaged 2.9 mathematics courses at the college level and 1.2 adult education courses. The average for the women teachers was 2.3 mathematics courses at the college level and 2.4 adult education courses.

When crossing teaching level (elementary, middle, secondary) with the other questions one finds the secondary school teachers have had the fewest number of adult education courses, averaging 2.2. With middle school teachers the average was 2.9, and the elementary school teachers averaged 5.0 adult education courses. When crossing teaching level with question eleven, which requested the teachers' opinion on which factors affect mathematics in ABE, the elementary school teachers felt inadequate facilities were significantly ($p < .05$) more of a problem than did the teachers of the other levels.

When crossing the number of mathematics courses taken, one finds the more mathematics courses teachers had in their professional preparation the better qualified they felt to teach mathematics ($p < .01$). Interestingly, the fewer mathematics courses teachers had, the less seriously they viewed the problems of inadequate student reading abilities.

Also the fewer mathematics courses teachers had, the greater the belief that mathematics was less important than other subjects. Also, the fewer mathematics courses teachers had, the less inclined they were to believe they needed assistance in lesson planning or obtaining subject matter information.

A crosstabulation with the number of mathematics courses and question fifteen (Table 4.12), which requested the teachers to indicate the way metric concepts were used in their class revealed that the teachers who did not include metric concepts in their courses had the fewest number of mathematics courses; 0 to 1 and 2 to 5 courses, respectively. One observes that 21.1% and 42.1% of the teachers with 0 to 1 mathematics courses, did not use the metric system in their classes and introduced it as a special unit only. Only 9.9% of the teachers introduced the metric system as a special unit and used it throughout the course.

The crosstabulation with the number of adult education courses a teacher had taken revealed a significant difference ($p < .05$) in the response to the belief that mathematics is less important than other subjects. The teachers with the fewest adult education courses (0-1) felt this was not a serious problem affecting mathematics instruction. The data tend to show that the teachers who had taken the fewest number of adult education courses (0-1) considered the various factors affected the ABE program less seriously than those with two or more adult education courses.

Table 4.12. Results From Teacher's Crosstabulation of Number of Mathematics Courses Crossed with Question 15: "Which of the following best indicates the way concepts related to the metric system are used in your class?"

Number of Mathematics Courses	0-1	2-5	5-11	11-
	percent of total percent of column			
Metric concepts are not included in this course.	7.8 21.1	15.7 28.6	0.0 0.0	0.0 0.0
They are introduced in a special metric unit, then seldom used during the remainder of the course.	15.7 42.1	21.6 39.3	2.0 50.0	0.0 0.0
They are introduced in a special metric unit and used throughout the course.	2.0 5.3	5.9 10.7	0.0 0.0	2.0 50.0
They are introduced as needed throughout the course, there is no special metric unit.	11.8 31.6	11.8 21.4	2.0 50.0	2.0 50.0

CHAPTER V

SUMMARY, CONCLUSIONS, EMERGING HYPOTHESES, AND RECOMMENDATIONS FOR FUTURE RESEARCH

5.1 Introduction

This chapter will include a brief summary of the literature and a reiteration of the findings produced by this study. Conclusions drawn from the review of the literature and findings will also be reported. Finally, there will be recommendations for ABE in Knox County, and for ABE in general. There will also be statements given as testable hypotheses generated from the information in the study.

5.2 Summary of Literature in Adult Basic Education

ABE fulfills the need to help adults whose difficulty in speaking, reading, or writing the English language affects negatively their efforts to get or retain employment appropriate to their real abilities (Dean and Lawson, 1980). ABE had its beginning in Kentucky in 1911 (Cortwright and Brice, 1970) and by 1973 ABE served over one million throughout the country and 15,000 in Tennessee (Adult Basic and Secondary Statistics, 1975).

The Economics Act of 1964 (P.L. 88-452) created the office of Economic Opportunity which was the beginning of ABE as it is known today. Expenditures increased from 30 million dollars per year to over 200 million dollars per year by 1978 (Bina and Dowling, 1976).

The beginning of formal teacher training for adult education was in Detroit in 1925 by the Detroit Teachers College (Neff, 1970). Little

research has been done in the area of ABE. According to Spear (1973, p. 1), "The most singular discovery emerging from nearly eighteen months of study is how little is known about teacher training in ABE by those most closely associated with it...."

ABE certification of teachers is a topic generating great differences of opinion. Spear (1973) found that administrators felt certification would eliminate good teachers, and teachers felt it would not. Mettran (1977) found that administrators and professors of adult education felt there should be ABE teacher certification.

Successful teacher characteristics ranged from broadmindedness and familiarity with the experience of failure (Cass, 1970) to having great empathy and humility in regard to their role as teachers (University of the State of New York, 1974). The characteristics most often stated were that ABE teachers must realize they are dealing with adult students, and teachers must treat their students as adults.

According to one researcher, six thousand new illiterates reach the age of fourteen each year (Cass, 1970). Researchers estimate that there are over 20 million functional illiterates over the age of 25 in the U.S., a large segment of the population which "...is not to be an integral part of society but a voiceless oppressed underclass" (Mocker, 1978 p. 12).

McGee (1974, p. 24) felt that the teacher is the most important resource in adult education. According to this researcher "...of greater concern, however, is the lack of a wide selection of relevant and innovative instructional materials for teachers' use. Often teachers have no choice but to use traditional materials that are

designed for grades k-12." Another problem that was found by Hall and Coley (1975) was that much of the teaching of reading to adults was done by people having little preparation in the teaching of reading.

5.3 Summary of Findings

5.3.1 Students

The average student in ABE in Knox County had completed 10.18 years of school and was 29.26 years of age. The students felt that teachers were their most useful source in ABE for mathematics learning.

The use of different daily mathematical tasks varied with age and sex. Few had calculated their paychecks or balanced a checkbook and fewer than one third had ever used a calculator. The female students helped their children with mathematics more than the men. The older students had calculated the cost of a few items more often than did the youngest group of students. Fifty percent of this youngest group (18-25) had never balanced a checkbook.

Computation with whole numbers and fractions were understood well by most students. However, many had problems with ratio and proportion, percentage, and word problems. The male students understood ratio and proportion better than did the female students.

Approximately half of the students found mathematics to be enjoyable and had a good feeling about mathematics. The results showed the men enjoyed mathematics more than the women and the age group of 45 and older enjoyed mathematics more than the younger age groups. The students with 9-11 years of schooling liked mathematics the least of all other groups.

5.3.2 Teachers

The teachers averaged 6.1 years of teaching. The male teachers averaged 2.9 mathematics courses and 1.2 adult education courses. The female teachers averaged 2.3 mathematics courses and 2.4 adult education courses.

The teachers felt that workshops were the most useful source of information about new developments in education. They also felt that inadequate student reading abilities was a serious problem affecting instruction in ABE. The teachers felt assistance from a mathematics educator would be helpful in learning new teaching methods and obtaining subject matter information.

Teachers found it most difficult to teach ratio and proportion and word problems. These are the same mathematical concepts the students have most trouble learning. The results of Aiken's Mathematics Attitude Scale showed the teachers had a good attitude about mathematics.

The number of mathematics courses taken related to how qualified a teacher thought he was to teach mathematics and the seriousness of various problems in ABE instruction. The more mathematics courses teachers had taken the better qualified they felt to teach mathematics. The fewer mathematics courses teachers had taken the less seriously did they think inadequate student reading abilities affected instruction in ABE. Also, the more mathematics courses teachers had, the more they included the metric system in their teaching.

5.4 Conclusions

These conclusions were developed on the basis of the preceding findings:

1. Curriculum specialists of both mathematics and adult education at the university level have failed to give proper attention to the adequate preparation of teachers who teach mathematics in ABE programs.
2. Researchers give little or no time to problems teachers face within the ABE program.
3. Researchers give little or no time to development of curricular materials for ABE.
4. Federal and state expenditures in ABE have not been used to develop professional incentive plans for teachers in ABE; i.e., professional incentive plans which promise career advancement and security.
5. Passing the General Education Development (GED) Examination is the primary objective educators teach for rather than developing literacy skills.
6. The state goals of ABE do not coincide with the actual objective of the typical ABE student.
7. Adult education specialists are concentrating their research on process, whereas the mathematics education specialists seem to be concentrating on content. Neither seems to be answering the questions of the ABE mathematics problems.

5.5 Hypotheses

The following are untested theories which can later be tested by experimental research.

1. States with formal certification procedures and requirements in ABE provide better instruction for ABE clientele than states without procedures and requirements.
2. The GED is a counter-productive incentive for ABE students because it has tended to skew instruction toward the examination and has caused the withdrawal of level I ABE students.
3. Programs that use texts other than elementary school mathematics texts provide for better learning of mathematics for ABE clientele.
4. Use of the calculator as a teaching aid would improve basic skills in mathematics for ABE clientele.
5. Teachers teaching within their specialty provide for better learning experiences for ABE clientele than those teaching out of their disciplines.
6. Students with adequate reading abilities receive better mathematics education in an ABE program than those with inadequate reading abilities.
7. A correlation exists between the dislike of mathematics and the failure to complete high school studies.

8. Teachers with positive attitudes about mathematics reduce the mathematics anxiety in ABE students.

In conclusion this study may provide information on this topic as well as stimulate fruitful research in the future.

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APPENDICES

APPENDIX A

Needs Assessment (Teachers)

1. Sex M F

2. What level did you or are presently teaching, if at the secondary level indicate subject?_____

3. How many years have you taught other than ABE? (include 79-80 as a year) _____

4. How many years have you taught or been associated with ABE classes? (again include 79-80 as a year) _____

5. Indicate the number of college level mathematics courses you have? 0-1 2-5 6-10 11 or more

6. Indicate the number of adult education courses you have? 0-1 2-5 6-10 11 or more

7. In what year did you last take a course for college credit? _____

8. What is the highest degree you have attained/ year attained? _____

9. As a source of information about new developments in education how useful do you find each of the following?

(check one on each line)

	not useful	somewhat useful	very useful
a. other teachers	__	__	__
b. supervisors	__	__	__
c. college courses	__	__	__
d. local in-service (or workshops)	__	__	__
e. journals and other publications	__	__	__
f. professional meetings such as NAPCAE.	__	__	__

10. Many teachers feel better qualified to teach some subject areas than others. How qualified do you feel to teach each of the following?

	(check one on each line) not well qualified	adequately qualified	very well qualified
a. Mathematics	__	__	__
b. Science	__	__	__
c. Social Studies	__	__	__
d. Reading	__	__	__

11. The following factors may affect mathematics instruction in the ABE program as a whole. In your opinion, how much of a problem is caused by each of the following?

	(check one on each line) Serious Problem	Somewhat of a Problem	Not a Significant Problem
a. Belief that mathematics is less important than other subjects	__	__	__
b. Inadequate facilities	__	__	__
c. Lack of materials for individualizing instruction	__	__	__
d. Out-of-date teaching materials	__	__	__
e. Insufficient number of worktexts	__	__	__
f. Lack of student interest in mathematics	__	__	__
g. Inadequate student reading abilities	__	__	__
h. Teachers inadequately prepared to teach mathematics	__	__	__
i. Not enough time to teach mathematics	__	__	__
j. Other	__	__	__

12. Please indicate your needs regarding assistance from a mathematics education resource person for each of the following:

(check one on each line)

	Usually Do Not Need Assistance	Would Like But Receive Little or None Assistance	Would Like and Receive Adequate Assistance
a. Establishing instructional objectives	__	__	__
b. Lesson Planning	__	__	__
c. Learning new teaching methods	__	__	__
d. Actually teaching lessons	__	__	__
e. Obtaining subject matter information	__	__	__
f. Using calculators	__	__	__

13. How many students in your class? _____

14. Please indicate the number of students at the approximate grade level

1__ 2__ 3__ 4__ 5__ 6__ 7__ 8__ 9__ 10__ 11__ 12__

15. Which of the following best indicates the way concepts related to the metric system are used in your class? (check one)

__ Metric concepts are not included in this course.

__ They are introduced in a special metric unit, then seldom used during the remainder of the course.

__ They are introduced in a special metric unit and used throughout the course.

__ They are introduced as needed throughout the course, there is no special metric unit.

16. How often do you use each of the following techniques in teaching mathematics to your class?

(check one on each line)

	Never	Less Than Once A Month	At Least Once A Month	At Least Once A Week
a. Lecture	__	__	__	__
b. Discussion	__	__	__	__
c. Library Work	__	__	__	__
d. Tests or Quizzes	__	__	__	__
e. Individual Assignments	__	__	__	__
f. Guest Speakers	__	__	__	__
g. Other	__	__	__	__

17. How difficult is it for you to get these mathematical concepts across to your students?

(check one on each line)

	Not Difficult	Somewhat Difficult	Very Difficult
a. addition with whole numbers	__	__	__
b. subtraction with whole numbers	__	__	__
c. multiplication with whole numbers	__	__	__
d. division with whole numbers	__	__	__
e. addition with fractions	__	__	__
f. subtraction with fractions	__	__	__
g. multiplication with fractions	__	__	__
h. division with fractions	__	__	__

17. Continued.

(check one on each line)

	Not Difficult	Somewhat Difficult	Very Difficult
i. ratio and proportion	___	___	___
j. percentage	___	___	___
k. word problems of any type	___	___	___
l. algebra	___	___	___

Aiken's Mathematics Attitude Scale (MAS)

Circle which best indicates how closely you agree or disagree with the attitude expressed in each statement: strongly disagree (SD), disagree (D), undecided (U), agree (A), or strongly agree (SA).

1.	I am always under a terrible strain in a mathematics class	SD	D	U	A	SA
2.	I do not like mathematics, and it scares me to have to take it.	SD	D	U	A	SA
3.	Mathematics is very interesting to me, and I enjoy arithmetic and mathematics courses.	SD	D	U	A	SA
4.	Mathematics is fascinating and fun.	SD	D	U	A	SA
5.	Mathematics makes me feel secure, and at the same time it is stimulating.	SD	D	U	A	SA
6.	My mind goes blank and I am unable to think clearly when working mathematics.	SD	D	U	A	SA
7.	I feel a sense of insecurity when attempting mathematics.	SD	D	U	A	SA
8.	Mathematics makes me feel uncomfortable, restless, irritable and impatient.	SD	D	U	A	SA
9.	The feeling that I have toward mathematics is a good feeling.	SD	D	U	A	SA
10.	Mathematics makes me feel as though I'm lost in a jungle of numbers and can't find my way out.	SD	D	U	A	SA
11.	Mathematics is something I enjoy a great deal.	SD	D	U	A	SA
12.	When I hear the word mathematics, I have a feeling of dislike.	SD	D	U	A	SA
13.	I approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics.	SD	D	U	A	SA
14.	I really like mathematics.	SD	D	U	A	SA
15.	Mathematics is a course in school that I have always enjoyed studying.	SD	D	U	A	SA
16.	It makes me nervous to even think about having to do a mathematics problem.	SD	D	U	A	SA

Aiken's Mathematics Attitude Scale (MAS) Continued.

17.	I have never liked mathematics, and it is my most dreaded subject	SD	D	U	A	SA
18.	I am happier in a mathematics class than in any other class.	SD	D	U	A	SA
19.	I feel at ease in mathematics, and I like it very much.	SD	D	U	A	SA
20.	I feel a definite positive reaction toward mathematics; it's enjoyable.	SD	D	U	A	SA

Needs Assessment (Students)

The following information will be helpful to the scope of this study.

Circle the appropriate response:

Sex: M F Age: 18-25 26-35 36-45 46-55 56-

Marital status: single married divorced widow/er

Indicate the highest grade completed. _____

1. What was (were) your favorite subject(s) in school?

2. What did you like or dislike about school?

3. How did you hear about ABE?

4. What made you decide to return to school?

5. What kind of job do you have now? (if none, write none)

6. What do you like or dislike about this job?

7. Indicate how useful each of the following sources are for your work in mathematics.

(check one on each line)

	not useful	somewhat useful	very useful
a. teachers	__	__	__
b. texts and workbooks	__	__	__
c. friends or relatives	__	__	__
d. other	__	__	__

8. Circle how often you read a newspaper: daily weekly monthly

9. Which magazines do you read?

10. Indicate the "last time" you: (check one on each line)

	last week	last month	never	not applicable
a. helped one of your children in mathematics				
b. calculated your pay check				
c. calculated the MPG for a car				
d. estimated the total cost for four or less items bought at a restaurant or store				
e. read your electric meter				
f. used a calculator				
g. filled out your own income tax form				
h. balanced your checkbook				
i. calculated the interest on a load or major purchase				

11. Indicate how well you understand each of the following mathematical concepts.

(check one on each line)

	very well	fairly well	not well
a. addition with whole numbers			
b. subtraction with whole numbers			
c. multiplication with whole numbers			
d. division with whole numbers			
e. addition with fractions			
f. subtraction with fractions			

11. Continued.

	(check one on each line) very well	fairly well	not well
g. multiplication with fractions	___	___	___
h. division with fractions	___	___	___
i. ratio and proportion	___	___	___
j. percentage	___	___	___
k. word problems of any type	___	___	___
l. algebra	___	___	___

Aiken's Mathematics Attitude Scale (MAS)

Circle which best indicates how closely you agree or disagree with the attitude expressed in each statement: strongly disagree (SD), disagree (D), undecided (U), agree (A), or strongly agree (SA).

1.	I am always under a terrible strain in a mathematics class	SD	D	U	A	SA
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5.	Mathematics makes me feel secure, and at the same time it is stimulating.	SD	D	U	A	SA
6.	My mind goes blank and I am unable to think clearly when working mathematics.	SD	D	U	A	SA
7.	I feel a sense of insecurity when attempting mathematics.	SD	D	U	A	SA
8.	Mathematics makes me feel uncomfortable, restless, irritable and impatient.	SD	D	U	A	SA
9.	The feeling that I have toward mathematics is a good feeling.	SD	D	U	A	SA
10.	Mathematics makes me feel as though I'm lost in a jungle of numbers and can't find my way out.	SD	D	U	A	SA
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15.	Mathematics is a course in school that I have always enjoyed studying.	SD	D	U	A	SA
16.	It makes me nervous to even think about having to do a mathematics problem.	SD	D	U	A	SA

Aiken's Mathematics Attitude Scale (MAS) Continued.

17.	I have never liked mathematics, and it is my most dreaded subject	SD	D	U	A	SA
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19.	I feel at ease in mathematics, and I like it very much.	SD	D	U	A	SA
20.	I feel a definite positive reaction toward mathematics; it's enjoyable.	SD	D	U	A	SA

APPENDIX B

Letter of Consent

Dear Participant:

The following is a needs assessment for a doctoral study at The University of Tennessee, Knoxville. Results gathered from this survey will be published in a research format, but any individual information will be kept strictly confidential. The information obtained here will be used to analyze the ABE program in Knox County with recommendations for change that could help the program in the future for you and others who are so motivated to get involved with ABE. You are not obligated to complete this survey and that decision will have no bearing on your standing in ABE. You also have the right to withdraw from participation at any time without penalty. However, the more responses that I receive the more valuable will be the study. If you have any questions at any time I will be glad to answer them. If you do consent to participate, please sign below as required by the University.

_____ / /80
Signature Date

Thank you for your help and cooperation.

Sincerely,

Kenneth S. Ross

Kenneth S. Ross
170 Taliwa Ct.
Knoxville, TN 37920
573-0411

VITA

Kenneth Scott Ross was born in Bayside, New York on October 19, 1952. His family moved to Miami, Florida in 1957. He attended elementary, junior, and high school in Miami, and was graduated from Miami Norland Senior High School in June 1970. The following September he entered the University of Florida, and in December 1974 he received a Bachelor of Science degree in Chemistry. He continued on at the University of Florida and in March 1976 he received a Master of Education degree in Secondary Education.

After teaching at Central Florida Community College and Palatka South High School, in the Fall of 1977 he entered the Graduate School of the University of Tennessee Knoxville, and accepted a teaching assistantship in the Mathematics Department. He received the Doctor of Education degree with a major in Curriculum and Instruction with an emphasis in Mathematics Education in August 1982.

The author is a member of Phi Delta Kappa and the National Council of Teachers of Mathematics. Mr. Ross is currently employed with Chattanooga State Technical Community College.

Mr. Ross is married to the former Kathryn Kim Kellar of Omaha, Nebraska, and has one child, Joseph.