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ABSTRACT

This report describes two studies on the extent of the implementation of the Kentucky Education Technology System (KETS), part of the Kentucky Education Reform Act of 1990 (KERA). Study 1 was an external evaluation using 8 university field observers (names are given); study 2 was a self-assessment study using 47 anonymous district technology coordinators field observers. The same research instrument was used in both studies. Both studies examined a random sample of the same 24 schools. Composite findings indicate that all districts are connected to the KETS network, and schools across the state had shown significant progress in building the capacity to make technology and technology networks available to students, teachers, and administrators. Aspects related to school structures of planning and organization had seen the most progress, yet wide differences were noted in the use of technological applications and options available for professional development. Principals were found to be generally positive about the potential of technology and committed to providing it for students. Word processing received considerable use in study schools, and databases and spreadsheets were beginning to be a regular part of instruction; telecommunication was rarely used for instruction or communication. In addition, the use of the two-way video teleconferencing network was found to be an efficient and cost-effective method for training data collectors. Basic classroom connectivity was found to be deficient; differentiating factors between low and high technology implementation schools were related to classroom instruction and professional development. Four appendices include an innovation component configuration map for educational technology, the principal and teacher interview questions, and statistical representations of gathered data. (NAV)

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THE KENTUCKY INSTITUTE FOR EDUCATION RESEARCH

The Implementation of the Kentucky Education Technology System (KETS)

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A Report of Research
conducted by the
Institute on Education Reform
University of Kentucky

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The Implementation of the Kentucky Education Technology System (KETS)

A report of two research studies conducted through the

Institute on Education Reform
University of Kentucky

Principal Investigator

Joan M. Mazur

November 1995

Supported with funds from the

Kentucky Institute for Education Research
Kentucky Department of Education

PREFACE

This research project is one of six studies conducted in the spring of 1995 to determine the extent schools and educators across Kentucky had implemented Educational Technology, High School Restructuring, The Primary Program, Professional Development, Performance Assessment, and School-Based Decision Making.

The studies were sponsored by the Kentucky Institute for Education Research, supported by funding from the Annie E. Casey Foundation. Each of the research projects was contracted to a the Kentucky university that managed the research and employed the services of a team of researchers/field observers, mostly from higher education institutions across the state.

Each study was designed to collect data from a random set of schools across the eight state educational regions. All studies used a research tool developed especially for studying the progress of program implementation called an Innovation Component Configuration Map. The Configuration Map enables researchers to judge the level of implementation of different program components based on a common set of standards and guidelines.

Collectively, through these six studies, more than fifty trained researchers visited 189 schools across the Commonwealth conducting interviews, observing classrooms, training sessions and school council meetings, reviewing documents and collecting artifacts. To date this research represents the single most comprehensive effort to gauge the level of implementation of programs initiated through the Kentucky Education Reform Act of 1990 (KERA).

The Kentucky Institute for Education Research is proud to be able to sponsor these projects and highly commends the members of the research teams and the universities for the excellent work of data collection and analysis they conducted under difficult conditions and a limited budget. On behalf of the Institute, I want to personally express my sincere appreciation to each of the principal investigators for their professional commitment to this statewide effort, their many hours of work beyond those budgeted in the contract and their perseverance to produce a high-quality report.

I sincerely hope you will find the contents of this report both informative and helpful.

Roger Pankratz, Executive Director
Kentucky Institute for Education Research

ACKNOWLEDGMENTS

This study could not have been conducted without the participation of many dedicated educators, researchers, and other personnel involved in technology and education in the state of Kentucky who contributed invaluable assistance. We thank them here.

To begin, we thank the principals and teachers who allowed the observers to visit their schools and classrooms, particularly at the end of the school year when time constraints are so pressing.

Next, we thank the 47 District Technology Coordinators who volunteered to collect data and who, because of confidentiality, must remain anonymous. They completed the observation instrument during a time of the year when their responsibilities are heaviest and their schedules the most hectic. The eight regional KETS coordinators also deserve praise for coordinating the recruiting and training efforts for the study. We also thank the university observers for taking time in their busy schedules to participate in the data collection. These observers are listed on the next page.

We also appreciate the assistance of Dr. Gene Hall, University of Northern Colorado, and Dr. Edward Caffarella, of that same institution, for assistance in the development of the map and for comments on a draft of the final report. Dr. Archie George, University of Idaho, analyzed the data and was most helpful in helping us to understand the data from the discriminate cluster analysis.

Lydia Wells-Sledge, Director of Customer Support Services, provided support for the various activities associated with the study. These included such diverse tasks as working on drafts of the map to providing the researchers with mailing lists of district technology coordinators.

Dr. Roger Pankratz, Executive Director of the Kentucky Institute for Education Research, has educated us in the purpose and effective use of Innovation Configuration Component Maps to assess progress of the KERA initiatives. He offered many valuable suggestions as to the conduct of the study and during the preparation of the final report.

Scott Adams, the research assistant for the project, coordinated the distribution and collection of the data and performed the numerous clerical tasks associated with a statewide effort of this type.

Joan Mazur, Assistant Professor
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STUDY I: EXTERNAL EVALUATION

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STUDY II: SELF-ASSESSMENT

DISTRICT TECHNOLOGY COORDINATORS FIELD OBSERVERS

There were 47 district technology coordinators who gathered data for this research and who must, unfortunately, remain anonymous to preserve confidentiality. Their participation and dedication is evidence of their commitment and professionalism.

TABLE OF CONTENTS

EXECUTIVE SUMMARY AND RECOMMENDATIONS vii
The Design of the Two Separate But Companion Studies vii
The Objectives of the Two Studies vii
Objectives of Study I: External Evaluation viii
Objectives of Study II: Self-Assessment viii
The Statewide Study Sample ix
Data Collection Procedures ix
Conclusions x
Recommendations xii

PURPOSE OF THE STUDIES 1
Background of the Studies 1
The Design of the Two Separate But Companion Studies 2
Development of the Observation Instrument 3
Objectives of the Two Studies 7

DATA COLLECTION PROCEDURES 8
The Statewide Study Sample 8
Data Collection Procedures 9
Observer Training 9

RESULTS OF THE OBSERVATIONS AND INTERVIEWS 10
Patterns of Implementation of Program Components Based on Configuration Map 10
Designating An Acceptable Range of Implementation vs. Levels of Practice That Need Improvement 11
Discussion of Technology Support for KERA Initiatives 13
Discussion of Technology Used in the Instructional Process 18
Discussion of Professional Development of School Staff 19
Discussion of School Technology Committee: Function and Processes 22
Discussion of KETS Resources 24
Discussion of Support for KETS (Including the Community) 25
Rater Reliability Between University Researchers and District Technology Coordinators 26
Analysis of Subcomponents Related to High Implementation of Technology Components 27
Comparison of High and Low Implementors 29
Results of the Interviews from Sample I: External Evaluation Only 32

CONCLUSIONS FOR STUDY I: EXTERNAL EVALUATION 33

CONCLUSIONS FOR STUDY II: SELF-ASSESSMENT 35

RECOMMENDATIONS 37

SUGGESTIONS FOR FURTHER RESEARCH 38

REFERENCES 40

APPENDICES 41

APPENDIX A 42
An Innovation Component Configuration Map for Educational Technology

APPENDIX B 43
Principal Interview

APPENDIX C 44
Teacher Interview

APPENDIX D 45
Figure 5. Comparison of High/Low Implementors for Study I: Technology Support for KERA Initiatives Component 46
Figure 6. Comparison of High/Low Implementors for Study I: Technology Used in the Instructional Process 47
Figure 7. Comparison of High/Low Implementors for Study I: Professional Development of School Staff 48
Figure 8. Comparison of High/Low Implementors for Study I: The School Technology Committee: Function and Process 49
Figure 9. Comparison of High/Low Implementors for Study I: KETS Resources 50
Figure 10. Comparison of High/Low Implementors for Study I: Community Support for KETS 51
Figure 11. Comparison of High/Low Implementors for Study II: Technology Support for KERA Initiatives Component 52
Figure 12. Comparison of High/Low Implementors for Study II: Technology Used in the Instructional Process 53
Figure 13. Comparison of High/Low Implementors for Study II: Professional Development of School Staff 54
Figure 14. Comparison of High/Low Implementors for Study II: The School Technology Committee: Function and Process 55
Figure 15. Comparison of High/Low Implementors for Study II: KETS Resources 56
Figure 16. Comparison of High/Low Implementors for Study I: Community Support for KETS 57

TABLES AND FIGURES

TABLE 1. Implementation Indicators Defined for the KETS Intentions 4

TABLE 2. Number of Districts Represented in Sample by State Educational Region 8

TABLE 3. Percent of Schools at Different Levels of Implementation for the Subcomponents of Technology Support for KERA Initiatives 12

TABLE 4. Percent of Schools at Different Levels of Implementation for the Subcomponents Technology Used in the Instructional Process 14

TABLE 5. Percent of Schools at Different Levels of Implementation for the Subcomponents of Professional Development of School Staff 19

TABLE 6. Percent of Schools at Different Levels of Implementation for the Subcomponents of School Technology Committee 20

TABLE 6A. Information on Aspects of the School Technology Coordinator Position 22

TABLE 7. Percent of Schools at Different Levels of Implementation for the Subcomponents of KETS Resources 23

TABLE 8. Percent of Schools at Different Levels of Implementation for the Subcomponents of Support for KETS (Including the Community) 25

TABLE 9. Spearman Rank-Order Coefficients for Study I: External Evaluation 27

TABLE 10. Spearman Rank-Order Coefficients for Study II: Self-Assessment 28

FIGURE 1. Study II: Self-Assessment Data Software Used in Instruction 16

FIGURE 2. Study II: Self-Assessment Data Uses of Technology in Instruction 17

FIGURE 3. Comparison of High/Low Implementors for Study I 30

FIGURE 4. Comparison of High/Low Impementors for Study II 31

THE IMPLEMENTATION OF KENTUCKY'S EDUCATION TECHNOLOGY SYSTEM (KETS)

EXECUTIVE SUMMARY AND RECOMMENDATIONS

The Design of the Two Separate but Companion Studies

This report presents the results of two separate studies that used the same research instrument to investigate the implementation of Education Technology in Kentucky schools for different purposes and employed a different set of data collectors.

Study I was conducted by trained researchers external to the districts of the schools studied. The purpose was to determine the extent of implementation of Educational Technology statewide as part of a larger effort by the Kentucky Institute for Education Research (KIER) to assess the implementation of six major KERA programs.

Study II was conducted by school District Technology Coordinators (DTCs) to assess the progress of Educational Technology in local districts. This study was conducted for the Kentucky Department of Education to determine the feasibility of using configuration maps as a research instrument for self-assessment and formative planning for further implementation of the KETS plan.

Fourteen schools were part of both studies to investigate the inter-observer reliability between the data collectors external and internal to the district. This feature of the study design was to test the feasibility of using District Technology Coordinators to collect reliable data for multiple purposes in a relatively low-stakes environment.

Since the research instrument was the same in both studies, the combined data from the companion studies provided more powerful results than either study could provide by itself.

Objectives of the Two Studies

The general purpose of both studies was to collect data on the extent of implementation of Educational Technology in schools – to provide a "snapshot" of current practice. However, the results were to be used for somewhat different purposes. The similarities and differences are presented in the objectives for each study.

Objectives of Study I : External Evaluation

- To determine the extent of implementation of the educational technology initiative (KETS) in a random sample of 24 randomly selected schools in the eight regions of Kentucky based on external observation and interview data from university researchers.
- To explore the use of the Configuration Map for Education Technology as a research tool and as a feedback instrument for ascertaining the extent of implementation of education technology.
- To describe teachers' and principals' perceptions of the implementation of the technology program.
- To compare the reliability and utility of the two methods of data collection using different observers.
- To make recommendations for improved practice.
- To obtain feedback on ways to improve the Configuration Map for Education Technology.

Objectives of Study II: Self-Assessment

- To determine the extent of implementation of the educational technology initiative (KETS) in a random sample of 104 schools in 47 districts geographically distributed throughout Kentucky based on self-report data from local district technology coordinators.
- To explore the use of the Configuration Map for Education Technology as a self-assessment tool and as a feedback instrument for planning future implementation strategies for KETS at the local district level.
- To determine the feasibility of using Kentucky's teleconferencing network for training local school personnel to collect self-study data on technology implementation.
- To compare the reliability and utility of the two methods of data collection.
- To make recommendations for improved practice.
- To obtain feedback on ways to improve the design of the Configuration Map for Education Technology.

The Statewide Study Sample

Study I: External Evaluation

A random stratified sample of 24 schools was selected and invited to participate in the study: one elementary, one middle, and one high school from each of Kentucky's eight educational regions. The school principal at each selected site was contacted directly by a university researcher or by the district technology coordinator who assisted the researcher. After the initial contact inviting participation and explaining the purpose and nature of the study, follow-up letters of agreement were sent to the school principals with a request for a list of teachers who were knowledgeable about the school's technology program. Two or three teachers were selected by the researchers from the list provided for on-site interviews.

Study II: Self-Assessment

In late April and early May of 1995 all District Technology Coordinators across the state were invited to participate in the self-assessment study. Forty-seven District Technology Coordinators responded and agreed to collect data on one elementary, one middle, and one high school in their district. In small districts where there was only one elementary, middle, or high school, data were collected on the only school available at each level. A total of 107 schools agreed to participate in Study II: Self-Assessment, with representation from all eight regions.

To crosscheck the reliability of the university observers in Study I with the internal District Technology Coordinators in Study II, the data from 14 schools that were common to both Sample I and Sample II were compared.

Data Collection Procedures

Study I: External Evaluation

University researchers in May and early June of 1995 visited each of the 24 selected sites for one day to observe technology being used in classrooms, computer laboratories, and media centers. The protocols used were developed in consultation with faculty from the Instructional Systems Design Program, and the Institute for Education Reform at the University of Kentucky. Teachers and principals at the study sites were interviewed to obtain their perceptions of the implementation of educational technology in their school.

The interviews were designed to gather supplemental information especially in two key areas: technology used in the instructional process and the professional development of school staff related to technology. For example, principals were asked how technology had contributed to the results of KIRIS and teachers were

asked how technology had changed their instructional practices, and to comment on their training experiences. The interview protocol was open-ended and researchers recorded responses directly on the interview forms.

Study II: Self-Assessment

District Technology Coordinators (DTCs) visited the schools in their district, which were randomly selected for the study. DTCs made observations, interviewed teachers and reviewed documents to complete the Configuration Map instrument. However, the DTCs did not conduct the more-extended interviews using the teacher and principal interview protocols described above for Study I.

CONCLUSIONS

1. Schools across Kentucky have shown significant progress in building the capacity to make technology and technology networks available to students, teachers and administrators. All districts are connected to the KETS network.

2. Statewide, schools have made the most progress in implementing aspects of KETS related to school's structures of planning and organization:

- implementing technology that is consistent with the school's technology plan,
- implementing technology planning committees that represent all stake holders,
- developing plans for technology and professional development that are consistent with the school's Transformation Plan.

3. There were wide variations in the extent of implementation of the 20 identified subcomponents of education technology and KETS among the schools in both Study I and Study II. These differences were most evident in the use of technology applications and options available for professional development.

4. While there has been an increase in the applications of technology for instruction, a significant effort for development and training will be needed for technology to reach its full potential as a tool for teaching and learning. Word processing received considerable use in the study schools. Spreadsheets and databases are beginning to be a part of regular instruction. However, telecommunications was rarely observed being used for instruction or communication.

5. Basic classroom connectivity is deficient. Phones in classrooms or connections to Internet services are lacking in most schools.

6. Factors that differentiated schools that were high implementors of education technology from low implementors were related directly to classroom instruction and

professional development:

a) The flexible scheduling of training options.
b) The availability of software applications to individuals.
c) The extent to which there was a technology-rich environment.
d) Professional development options in technology.
e) The extent to which technology is used in the instructional process.

High implementation seems to be highly related to components of KETS that focus on classroom instruction and individual classroom teachers. Components that relate to school structures such as the development of a technology plan or the composition of the school technology committee seem less important as indicators of high implementation.

7. While professional development was found to be associated with high implementation of education technology, only one-quarter (25%) of schools in the sample are providing a rich array of professional development options and only one-third overall (30%) provide ongoing, flexible professional development suited to individual needs.

8. Principals are generally positive about the potential of technology and committed to providing students with technology. However, many are frustrated and apprehensive regarding the time needed to develop technological expertise and how to obtain the needed matching dollars to be eligible for KETS funds. Teachers also were positive about the possible applications of technology to instruction and believed it was essential that students have access to technology to prepare them for an increasingly technological workplace. Like the principals, teachers were frustrated with the lack of time to learn to use computers. Teachers who used technology more extensively reported changes in their teaching practices that provided more support of active student learning and less direct teaching methods such as lecturing.

9. The Innovation Component Map for Education Technology proved to be a useful instrument for gathering data on the variation of practice that exists in Kentucky schools related to the implementation of Education Technology. The reliability data comparing the ratings of external researchers and district technology coordinators were encouraging for the first-time use of a qualitative instrument. Feedback from researchers provided useful data to revise and improve the Configuration Map for Education Technology.

10. The use of Kentucky's two-way video teleconferencing network was an efficient and cost-effective method of training data collectors. In the relatively short 1/2 day training, the DTCs were able to report findings that correlated 76 percent of the time with professional researchers. The cost-benefit analysis is very favorable. Rather than paying upwards of $2,000.00 for travel and expenses, the video sites were available for less than $30/hour ($180.00).

RECOMMENDATIONS

1. The Kentucky Department of Education should identify schools that are high implementors and demonstrate exemplary practices in specific components of Education Technology. Strategies should be developed to disseminate successful approaches of implementation and utilize the expertise in high-implementing school to provide technical assistance to schools needing help.

2. All schools in the state should conduct a self-assessment using the Configuration Map for Education Technology, or similar diagnostic instrument, to determine relative strong components of Education Technology and specific components most needing attention. The Kentucky Department of Education should provide training in the use of the Configuration Map to all District Technology Coordinators.

3. Schools should focus more development and training efforts on broad applications of technology for instruction, specifically in the use of databases and telecommunications.

4. Schools should design professional development in Education Technology that provides more of a variety of options for staff throughout the year and that is integrated (a part of and not separate from) with other professional development efforts to improve instruction. Also, schools should make more use of networks to deliver on-line instruction and to promote information sharing among individuals.

5. The Kentucky Department of Education should identify and target schools that are low implementors for the purpose of providing assistance to upgrade resources and supporting equity in educational opportunities.

6. All schools should make networking – within their schools and with other schools – a high priority. The Kentucky Department of Education should make available to schools assistance in networking through the Regional Service Centers and through identified schools highly involved in networking.

7. School principals should involve School Technology Coordinators more directly as part of the school's instructional planning team for the purpose of using technology for instruction.

8. All schools need to develop and maintain more effective public information and outreach strategies to support the Kentucky Education Technology System (KETS).

THE IMPLEMENTATION OF KENTUCKY'S TECHNOLOGY PROGRAM

PURPOSE OF THE STUDIES

Background

In 1986, 66 property-poor Kentucky school districts sued the State School Board alleging that Kentucky schools were inefficient and funding for Kentucky schools was inequitable. The State Supreme Court ruled in favor of the plaintiffs and directed the legislature to enact education reforms that addressed both efficiency and equity. The Kentucky Education Reform Act (KERA), passed by the Kentucky legislature in March 1990, mandated a complete restructuring of the Kentucky educational system in the areas of finance, governance, and curriculum. One component of the curriculum restructuring included a comprehensive technology initiative that would support instruction and communication. The technology statute, KRS 156.666, established a Council for Education Technology. Under law the council was charged to develop a five-year master plan for education technology, that defined the Kentucky Education Technology System (KETS). KETS is designed to assist Kentucky schools in their effort to:

1. improve learning and teaching and the ability to meet the needs of individual students while increasing student achievement;
2. improve curriculum delivery to help meet the need for educational equity across the state;
3. improve the delivery of professional development;
4. improve the efficiency and productivity of administrators; and,
5. encourage development by the private sector and acquisition by districts of technology and applications appropriate for education.

KETS is an extensive plan for statewide implementation that includes (a) specifications of technical aspects such as the requirements for computer hardware and software, video capacity, and wiring specifications for communication technologies; (b) recommendations for instructional uses of technology such as individualizing instruction, remediation, and collaborative learning via electronic networks; (c) hardware and software requirements for managerial uses of technology such as district reporting and delivery of professional development; and, (d) recommendations for the use of technology to facilitate communication between the school and the community.

The state's technology initiative required extensive foundational work and time was lost initially in its implementation. Standards for the amount and kinds of technology needed to be developed prior to the actual delivery of goods and services

into the schools. The KETS standards are documented in several plans such as the *KETS Implementation Plan*, and the *KETS Architectural Standards and Technical Specifications*. The KERA technology initiative is an extensive technical and instructional undertaking. In order for technology to be used, it must be selected with the particular needs of the school, the teachers, and the students in mind. These needs range from training and professional development of staff to physical plant considerations such as space, wiring, fiber-optic cabling, climate control for equipment, and network designs.

An appropriate analogy to the KERA technology initiative is the implementation of books during the 15th century. At that time, the invention of moveable type revolutionized the production of texts and made print media accessible to the general public for instruction and other purposes. Prior to using the content contained in the texts several steps had to occur. First, quantities of paper had to be made available in large supply. Handwritten material had to be set in type and the books printed. Books had to be distributed. But having the books available would not be enough; the users also had to be taught to read. In addition, their school rooms had to be changed. They would need rooms that admitted adequate light to read. Teaching was affected. Teachers who formerly relied on oral teaching methods would now work from printed texts with students who had read the same materials. Many steps were taken to implement printed media in instruction and many changes occurred, over time.

KERA is a funded legislative mandate. The reform act earmarked a dedicated technology fund to support the initiative. While some districts had availed themselves of the designated technology funds previously, the 1993-94 school year marked the first large-scale round of submissions of District Technology Plans, prepared in accordance with standards. These plans defined the current technology status of each district with reference to the standards and outlined districts' unmet needs. The plans were reviewed by the Kentucky Department of Education (KDE) and if approved a district procured the equipment using a 50/50 percent match of state technology funds to local funds. According to the KDE plan reviewers there has been an infusion of technology into the schools since the approval of all the districts' technology plans in 1993-4.

The Design of the Two Separate but Companion Studies

This report presents the results of two separate studies that used the same research instrument to investigate the implementation of Education Technology in Kentucky schools for different purposes and employed a different set of data collectors.

Study I was conducted by trained researchers external to the districts of the schools studied. The purpose was to determine the extent of implementation of Educational Technology statewide as part of a larger effort by the Kentucky Institute for Education Research (KIER) to assess the implementation of six major KERA programs.

Study II was conducted by school District Technology Coordinators (DTCs) to assess the progress of Educational Technology in local districts. This study was conducted for the Kentucky Department of Education to determine the feasibility of using a research instrument (Configuration Maps) for self-assessment and formative planning for further implementation of the KETS plan.

Fourteen schools were part of both studies to investigate the inter-observer reliability between the data collectors external and internal to the district. This feature of the study design was to test the feasibility of using District Technology Coordinators to collect reliable data for multiple purposes in a relatively low-stakes environment.

Since the research instrument was the same in both studies, the combined data from the companion studies provided more powerful results than either study could provide by itself.

Development of the Observation Instrument: A Component Configuration Map for Education Technology

The development of the observation instrument for this study began in May 1994. Roger Pankratz, from the Kentucky Institute for Education Research, convened a meeting of district technology coordinators, regional KETS coordinators, university researchers, and personnel from the Kentucky Department of Education. The model for the observation instrument is based on the work of Hall and Hord (1987), who have done extensive research on school change. The development consultant, Dr. Ed Caffarella from the University of Northern Colorado at Boulder, who has extensive experience with the model employed for the instrument, facilitated map development at that meeting and has given feedback on iterations of the map. At this work session, an initial draft of a component configuration map was constructed and field tested in two school districts. Feedback from three additional field tests was incorporated into subsequent drafts. Using these drafts, representatives from these key stakeholder groups further revised and refined the instrument during the fall of 1994.

The developers of the Configuration Map for Education Technology consulted the guidelines and standards for technology contained in various documents available from the Kentucky Department of Education and the University of Kentucky's Institute for Education Reform. Among these were: The *KETS Implementation Plan*, which outlines schedules, project descriptions, project management, costs, and policy issues; the *KETS Architectural Standards and Technical Specifications*, which specifies the standards for both hardware and software; the *KETS Blueprint and Selection Guide*, which establishes criteria for procuring hardware and software; and the *KETS Building Wiring Standards*, which provides guidelines for the wiring to enhance connectivity for computer networks. The KETS plan is unusual because it not only details technology to be installed in the schools but it also makes recommendations that technology be used to support various instructional, management, and equity goals. Using these documents as guides, the intentions of the technology initiative could be operationalized by describing the key components at their highest level of implementation. Table 1 defines the implementation indicators for five major objectives of the KETS program.

Table 1
Implementation Indicators Defined for the KETS Intentions.

KETS Intentions	Implementation Indicators Defined
1. Improve learning and teaching and the ability to meet the needs of individual students while increasing student achievement;	A Technology Support for KERA indicator would define the extent to which technology is available to students and teachers; variations in the types of technology and software; and evidence that implementation is focusing on the needs of individuals. Indicators for measures of achievement were not the focus of the map for this implementation study.
2. Improve curriculum delivery to help meet the need for educational equity across the state;	A Technology Support for KERA indicator would define the extent to which technology is available to students and teachers. Variations in the types of technology and software are evidence that implementation is focusing on curriculum and the needs of individuals. Indicator gives evidence of technology used in the instruction on a regular basis.
3. Improve the delivery of professional development;	A Professional Development of School Staff indicator would define activities that train users in the use of technology and use technology as part of other KERA trainings.
4. Improve the efficiency and productivity of administrators; and,	A KETS Resources indicator would define the extent of networking resources available to the Central Office, Library, and classrooms and if these resources will be installed. Training will be planned or has occurred. The system will be in use.
5. Encourage development by the private sector and acquisition by districts of technology and applications appropriate for education.	A School Technology Committee indicator would define the extent of involvement of community stakeholders and existing documentation that shows coordination of efforts with other curriculum and planning activities. Community Support for KETS would be indicated by events, documents, and activities that relate to the initiative.

Six implementation indicators, with 20 subcomponents, were adopted as categories for a last draft of the map. These indicators are: (1) technology support for KERA initiatives, (2) technology used in the instructional process, (3) professional development for school staff, (4) the school technology committee: function and processes, (5) KETS resources, and (6) support for KETS (including community support).

Technology Support for KERA Initiatives contains subcomponents that indicate if technology is available to meet the standards of the technology initiative and if technology is a vehicle for equity; that is, it is accessible and various modes of technology and software are available to meet the needs of individuals.

Technology Used in the Instructional Process contains subcomponents that elicit information regarding the extent to which there is a technology-rich environment to which students have flexible access in accordance with the KETS standard and if that technology is being used for instruction.

Professional Development for School Staff contains subcomponents that indicate the extent to which training is provided and if that training is flexible or individualized to meet staff needs. A subcomponent for the function and processes of the school technology committee is included in this category. The school technology committee has a key role in the implementation of technology. The needs for a particular school and patterns of implementation (such as installation of computers in labs versus classrooms first) are determined by the committee. Thus examining its functions and processes are important to understanding implementation.

School Technology Committee: Function and Processes contains subcomponents that describe the composition of the School Technology Committee and its function and role in the technology planning process. Since planning for technology is critical to its implementation, examining the processes of the School Technology Committee is key to understanding technology use in a school.

Resources for KETS contains subcomponents that describe technology implementation in the library/media center, the central office, and of the installation of phones in classrooms. These are areas that provide in-school resources as well as connectivity to outside electronic networks and resources.

Support for KETS contains subcomponents that describe broader-based community support as well as adjunct programs in schools (such as providing computers to teachers during the summer for development) that may exist to support implementation.

Following a seminar/feedback session attended by District Technology Coordinators at the Kentucky Educational Technology Conference in February of 1995, the Configuration Map used for this study was finalized.

The instrument design was based on the Hall and Hord (1987) model of an Innovation Component Configuration Map (see Appendix A: An Innovation Component Configuration Map for Education Technology). The Map identifies key components of an innovation and the variations that occur in the implementation of the

innovation. The KERA technology initiative, operationalized according to the KETS requirements, was considered to be the innovation and the various aspects of the KETS plan were considered to be the program components. The different ways in which teachers might implement each component were considered to be the variations. Descriptions of variations were developed for the following components and subcomponents:

Technology Support for KERA Initiatives

- Technology available to individuals
- Consistency with the school technology plan
- Application of technology

Technology Used in the Instructional Process

- The learning environment
- Extent of technology application in the instructional process

Professional Development of School Staff

- Consistency among Professional Development Plan, the Technology Plan and the School Transformation Plan
- Professional development options in technology
- Scheduling of technology training options
- Design of technology training

School Technology Committee: Function and Processes

- Composition of school technology committee
- Development of the School Technology Action Plan
- The involvement in decision making
- Professional development of the school technology coordinator
- Compensation for the school technology coordinator
- Additional opportunities for the school technology coordinator

Kentucky Education Technology System (KETS) Resources

- The library/media center
- Phones in classrooms
- Central Office

Support for KETS (Including the Community)

- Group support for KETS implementation
- School-based activities that support KETS

Objectives of the Two Studies

The general purpose of both studies was to collect data on the extent of implementation of Educational Technology in schools – to provide a "snapshot" of current practice. However, the results were to be used for somewhat different purposes. The similarities and differences are presented in the objectives for each study.

Objectives of Study I : External Evaluation

- To determine the extent of implementation of the educational technology initiative (KETS) in a random sample of 24 randomly selected schools in the eight regions of Kentucky based on external observation and interview data from university researchers.
- To explore the use of the Configuration Map for Education Technology as a research tool and as a feedback instrument for ascertaining the extent of implementation of education technology.
- To describe teachers' and principals' perceptions of the implementation of the technology program.
- To compare the reliability and utility of the two methods of data collection using different observers.
- To make recommendations for improved practice.
- To obtain feedback on ways to improve the Configuration Map for Education Technology.

Objectives of Study II: Self-Assessment

- To determine the extent of implementation of the educational technology initiative (KETS) in a random sample of 104 schools in 47 districts geographically distributed throughout Kentucky based on self-report data from local district technology coordinators.
- To explore the use of the Configuration Map for Education Technology as a self-assessment tool and as a feedback instrument for planning future implementation strategies for KETS at the local district level.
- To determine the feasibility of using Kentucky's teleconferencing network for training local school personnel to collect self-study data on technology implementation.
- To compare the reliability and utility of the two methods of data collection.
- To make recommendations for improved practice.
- To obtain feedback on ways to improve the design of the Configuration Map for Education Technology.

DATA COLLECTION PROCEDURES

The Statewide Study Sample

Study I: External Evaluation

A random stratified sample of 24 schools was selected and invited to participate in the study: one elementary, one middle, and one high school from each of Kentucky's eight educational regions. The school principal at each selected site was contacted directly by a university researcher or by the district technology coordinator who assisted the researcher. After the initial contact inviting participation and explaining the purpose and nature of the study, follow-up letters of agreement were sent to the school principals with a request for a list of teachers who were knowledgeable about the school's technology program. Two or three teachers were selected by the researchers from the list provided for on-site interviews.

Study II: Self Assessment

In late April and early May of 1995 all District Technology Coordinators across the state were invited to participate in the self-assessment study. Forty-seven District Technology Coordinators responded and agreed to collect data on one elementary, one middle, and one high school in their district. In small districts where there was only one elementary, middle, or high school, data were collected on the only school available at each level. A total of 107 schools agreed to participate in Study II: Self-Assessment, with representation from all eight regions. Table 2 shows the number of school districts across the state by region that agreed to participate in the study. Region 3 shows only two districts participating; however, this is because this region includes Jefferson County (Louisville) and has only two districts in the region. Of 107 schools in Study Sample II, 37 percent were elementary schools, 28 percent were middle school, and 35 percent were high schools.

Table 2
Number of Districts Represented in Sample by State Educational Region

Region	Location Of Regional Service Center	Number of Districts
1	Murray	9
2	Bowling Green	8
3	Louisville	2
4	Covington	7
5	Lexington	5
6	Corbin	5
7	Morehead	6
8	Prestonsburg	5

To crosscheck the reliability of the external university observers with the internal District Technology Coordinators, the ratings from 14 schools that were common to both Sample I and Sample II were compared.

Data Collection Procedures

Study I: External Evaluation

University researchers visited each of the 24 selected sites for one day to observe technology being used in classrooms, computer laboratories, and media centers. The protocols used were developed in consultation with faculty from the Instructional Systems Design Program and the Institute for Education Reform at the University of Kentucky. Teachers and principals at the study sites were interviewed to obtain their perceptions of the implementation of educational technology in their school.

The interviews were designed to gather supplemental information especially in two key areas: technology used in the instructional process and the professional development of school staff related to technology. For example, principals were asked how technology had contributed to the results of KIRIS and teachers were asked how technology had changed their instructional practices and to comment on their training experiences. The interview protocol was open-ended and researchers recorded responses directly on the interview forms (see Appendices B and C).

Study II: Self-Assessment

District Technology Coordinators (DTCs) visited the schools in their district which were randomly selected for the study. DTCs made observations, interviewed teachers, reviewed documents and completed the Configuration Map instrument. However, the DTCs did not conduct the more-extended interviews using the teacher and principal interview protocols described above for Study I.

Observer Training

Study I: External Evaluation

Observers for Study I were selected from Kentucky universities based on their knowledge and research background in technology. For example, one observer was a sociologist whose research has focused on technology and occupational dynamics in rural schools. Another observer is a former high school teacher and now a business education professor teaching in a computer science department. Yet another is an expert in distance learning at a regional university.

University observers were sent the Configuration Maps and protocol materials. After an opportunity to study these materials, training was conducted individu-

ally with observers in conference with the project director. Three of the seven observers were experienced with the use of Configuration Maps and had previously been trained in their use for studies of the Primary Program and School-Based Decision Making.

Study II: Self-Assessment

The DTC observers were solicited on a voluntary basis by the KETS coordinators in each of the eight State Regional Service Centers. The DTCs were highly familiar with the KETS mandates and requirements and have first-hand knowledge of the schools in their districts.

The training of the DTC observers consisted of one three-hour training session that was offered on two separate days to accommodate schedules. The training was conducted using the statewide telecommunications system at the interactive video sites in Lexington, Hazard, Ashland, Frankfort, Murray, Bowling Green and Madisonville. The principal investigator conducted the trainings and began with the development process for the observational instrument and the rationale for using the Innovation Component Configuration Map as the data-collection instrument. The Configuration Map components and variations in practice were explained in detail. The observers then watched several video vignettes of teachers, students, and administrators using technology in their classroom or office. After viewing the tape and marking the map, the observers discussed their ratings, the rationale for their decisions. The final step in the process was to reach consensus on the level of practice.

In a few cases DTCs were unable to attend the telecommunications sessions. For these observers, videotapes of the training (which included the videotaped classroom examples) and individual instruction were used. Feedback and discussions of the observer's ratings were conducted with the principal investigator via phone.

RESULTS OF THE OBSERVATIONS AND INTERVIEWS FOR THE TWO STUDY SAMPLES

Patterns of Implementation of Program Components Based on the Configuration Map

The results from the observational component for the study are organized around the six implementation indicators of the Innovation Component Configuration Map for Education Technology: *Technology Support for KERA Initiatives, Technology Used in the Instructional Process, Professional Development of School Staff, The School Technology Committee, The KETS Resources, and Support for KETS From the Community.* The Components and Subcomponents of Education Technology are presented in

Tables 3-8. Each table represents the percent of schools at different levels of implementation for one of the six components and shows the data for its particular subcomponents.

Designating An Acceptable Range of Implementation Vs. Levels of Practice that Need Improvement

The data from the companion studies represent an initial evaluation of schools' implementation of KETS guidelines. The Configuration Map instrument defines implementation patterns in schools that are generally consistent with an acceptable range as judged by researchers, practitioners, and staff from the Kentucky Department of Education. To highlight the extent to which acceptable patterns currently exist in Kentucky schools the tables that follow are divided with a dotted line to designate an acceptable range of implementation vs. levels of practice that need improvement.

Schools rated with implementation patterns A and B (which are to the left of the dotted lines in Tables 3 through 8) were implementing the components of the technology program in acceptable ways, whereas schools which were rated with patterns C, D, and E comprise a group in need of improvement. It is important to note that schools whose practices fall in the B range have made good progress but still need to continue to strive to demonstrate the most acceptable level of implementation. Following each data table, summary discussions are given for both Study I external evaluation and Study II self-assessment. The major similarities and differences between the two data sets are described.

The reader should remember that Study I: External Evaluation represents data collected by university observers from 24 schools randomly selected in the eight regions across the state. Study II: Self-Assessment represents data collected by DTCs who volunteered to participate in the study. Fourteen schools were observed independently by both university observers and DTCs.

TABLE 3
Percent of Schools at Different Levels of Implementation for the Subcomponents of Technology Support for KERA Initiatives
Study I N=24 Schools, Study II N=107 Schools

Technology Availability to Individuals

	A	B	C	D
	A wide variety of technologies is available for learning, management, and communication. Technologies are available in sufficient quantity to promote widespread use and include computers, telephone, VCR, Videodisc and network access.	A selection of technologies is available for learning, management, and communication, but the selection is limited by either access to the technology or the number available.	A limited number of technologies is available for learning, management, and communication. Access is difficult (e.g., phone available and only in teacher's lounge) and includes few technology options including only one or two of the following: computers etc.	Little or no technology is available for learning, management, and communication. There are no (or few) phones in classrooms. no (or few) personal computers, camcorders, VCRs, etc.
Study I	25%	42%	33%	0%
Study II	23%	53%	23%	1%

Applications of Technology

	A	B	C	D
	There is a broad array of software applications (more than 10) in use for instruction, information networking, research, management, and planning. Most employees, students and parents use basic productivity packages, CD reference material, e-mail, etc.	There is a variety of software applications (5-10) in use in the school for instruction, management, and information networking. The majority (more than 2/3) of employees, and students use productivity packages, CD reference materials, e-mail, etc.	There are several software applications (3-5) in use in the school for instruction, management, and information networking. Some (more than 1/3) employees, and students use productivity packages, CD reference materials, e-mail, etc.	There is a limited number of applications (0-2) in use in the school for instructions, management, and information networking. Only a few (1/3 or less) of employees, and students use productivity packages, CD reference materials, e-mail, etc.
Study I	25%	25%	42%	8%
Study II	58%	32%	7%	3%

Consistency of Available Technology with School Technology Plan

	A	B	C	D
	The technology present in the school fully reflects the diffusion of technology laid out in the school's current technology plan. For example, if computers are available only in labs, is the school's plan to spend KETS money first on labs?	The technology present in the school partially reflects the diffusion of technology laid out in the school's current technology plan.	The technology present in the school runs counter to the diffusion of technology laid out in the school's current technology plan.	The technology present in the school indicates the diffusion of technology laid out in the school's current technology plan has not begun in any way.
Study 1	42%	58%	0%	
Study II	40%	46%	14%	

Discussion of Technology Support For KERA Initiatives

Schools in both study samples were providing a wide range of technologies that were available to teachers and students. DTCs, however, judged a larger percent of their schools in the acceptable range in this subcomponent than the researchers found for schools in Study I.

This difference between the schools in Study I and Study II was extremely large for the Applications of Technology subcomponent. Whereas researchers external to the school found only 50 percent of their school at the acceptable range on this subcomponent, DTCs judged 90 percent to be providing an acceptable array of software applications. It is not known whether this marked discrepancy resulted from differences in understanding of the levels of implementation or whether DTCs gave their schools higher ratings because of their familiarity with the applications of technology available.

A strong majority of schools in both studies were judged to have Consistency of Available Technology with the School Technology Plan. While 14 percent of DTCs judge the consistency between practice and plans in their schools to be less than the acceptable range, most schools were judged to be "on target" with implementing their technology plans.

TABLE 4

Percent of Schools at Different Levels of Implementation for the Subcomponent of Technology Used in the Instructional Process Study I N=24 Schools, Study II N=107 Schools

Extent to Which There is a Technology-Rich Learning Environment					
	A	B	C	D	
	Computers and other appropriate technology are located in areas that enable all students to have flexible (often simultaneous) access to computers during instructional activities. Students help each other.	Computers and other appropriate technology are located in areas that enable many (more than 2/3) students to have flexible (often simultaneous) access to computers during instructional activities. Mostly students help each other with some teacher aid.	Computers and other appropriate technology are located in areas that enable many (up to 1/3) students access to computers, but disrupt other instructional activities. Teacher primarily helps students on the computers.	Computers and other appropriate technology are not available or located in areas that do not enable students to have flexible access during instructional activities. No help is given if a student is using a computer.	
Study I	29%	29%	25%	17%	
Study II	35%	28%	28%	9%	
Extent of Technology Application in the Instructional Process					
	A	B	C	D	E
	A variety of technology applications are regularly used as ongoing elements in the instructional process.	Several technology applications are regularly used as ongoing elements in the instructional process.	One or two technology applications are regularly used as ongoing elements in the instructional process.	One or two technology applications are occasionally used as ongoing elements in the instructional process.	Technology applications are seldom used as ongoing elements in the instructional process.
Study I	21%	33%	25%	17%	4%
Study II	16%	45%	25%	13%	1%

Discussion of Technology Used in the Instructional Process

From one-half to two-thirds of schools in both study samples were judged to provide a Technology-Rich Learning Environment along with the Use of Technology for Instruction in the acceptable range of practice. However, this also means that one-third to one-half of Kentucky schools are not operating in the acceptable range. These findings clearly identify an area where assistance and staff development are needed to bring more schools into the acceptable range of using technology for instruction.

Types of Software Used in Instruction

Observers for both study samples recorded the extent of use of six different types of software. Figure 1 on the following page shows the extent of use reported in Study II. As can be seen, the extent of use of these types of software is very similar for both study samples. From Figure 1 it is clear that word processor software by far gets the most use (several times daily by a majority of schools). Databases, spreadsheets and electronic instructions materials (e.g., commercially available compact discs) are generally used weekly or twice monthly. Telecommunications and multimedia production software are used the least (monthly, if at all).

Instructional Purpose for Which Software is Used

Observers in both studies also recorded how software was being used for instruction and the frequency of instructional uses. Figure 2 on page 17 shows the frequency with which the 107 schools use software for seven different instructional purposes in Study II. The instructional use for Word Processing Tasks (such as composition or revision) is clearly the front runner with several times daily use in most schools. The use of software for portfolio development and storage of information also is a daily occurrence. The remaining four instructional purposes (i.e., analysis of data, management of instruction, planning for instruction and record keeping) all get varied but at least weekly use by most schools. While the uses of software for instruction are not as frequent or extensive as they need to be for Kentucky's high expectations, there is evidence that instruction in schools is changing as a result of KETS.

Figure 1
Study II: Self-Assessment Data
SOFTWARE USED IN INSTRUCTION

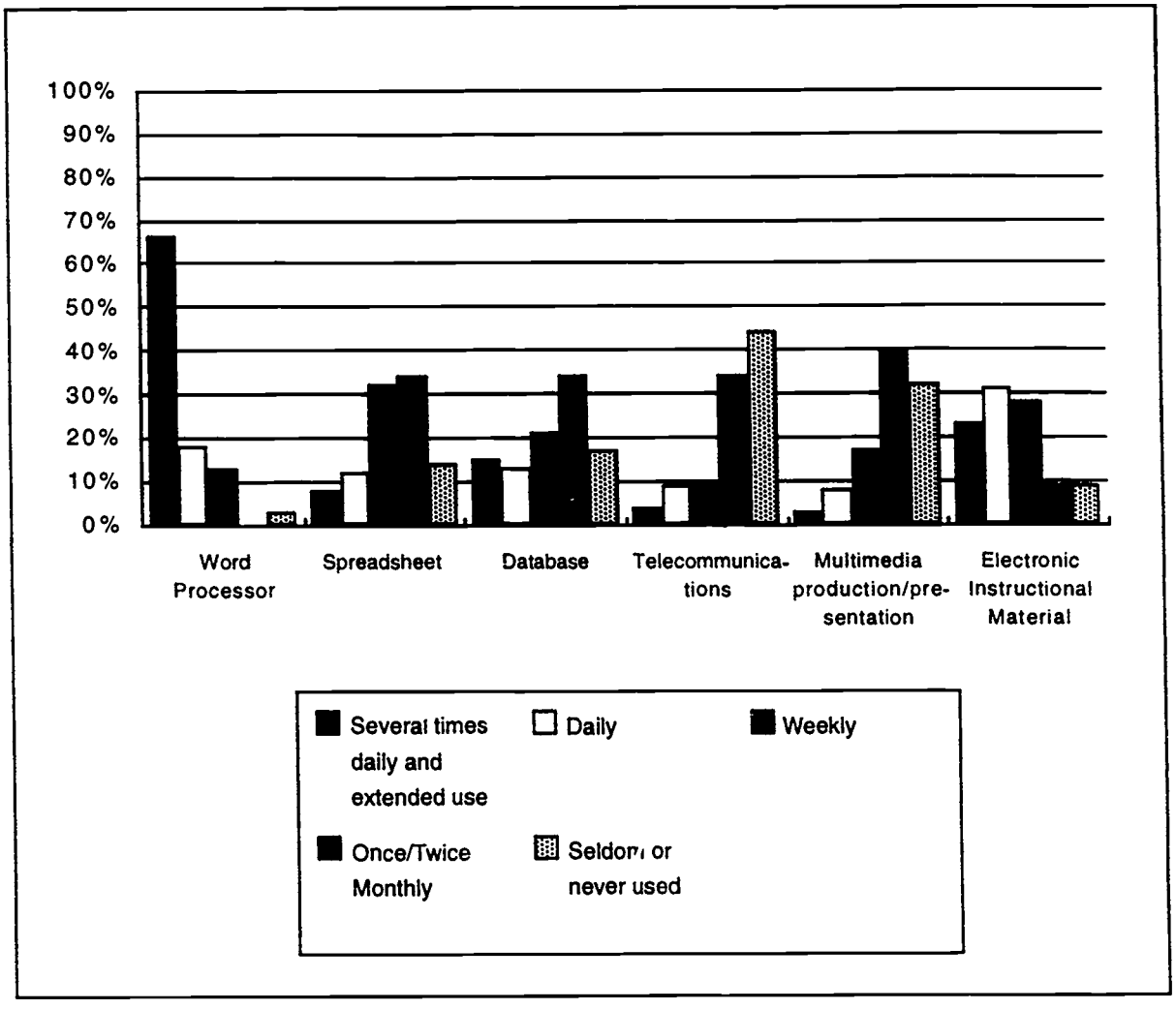
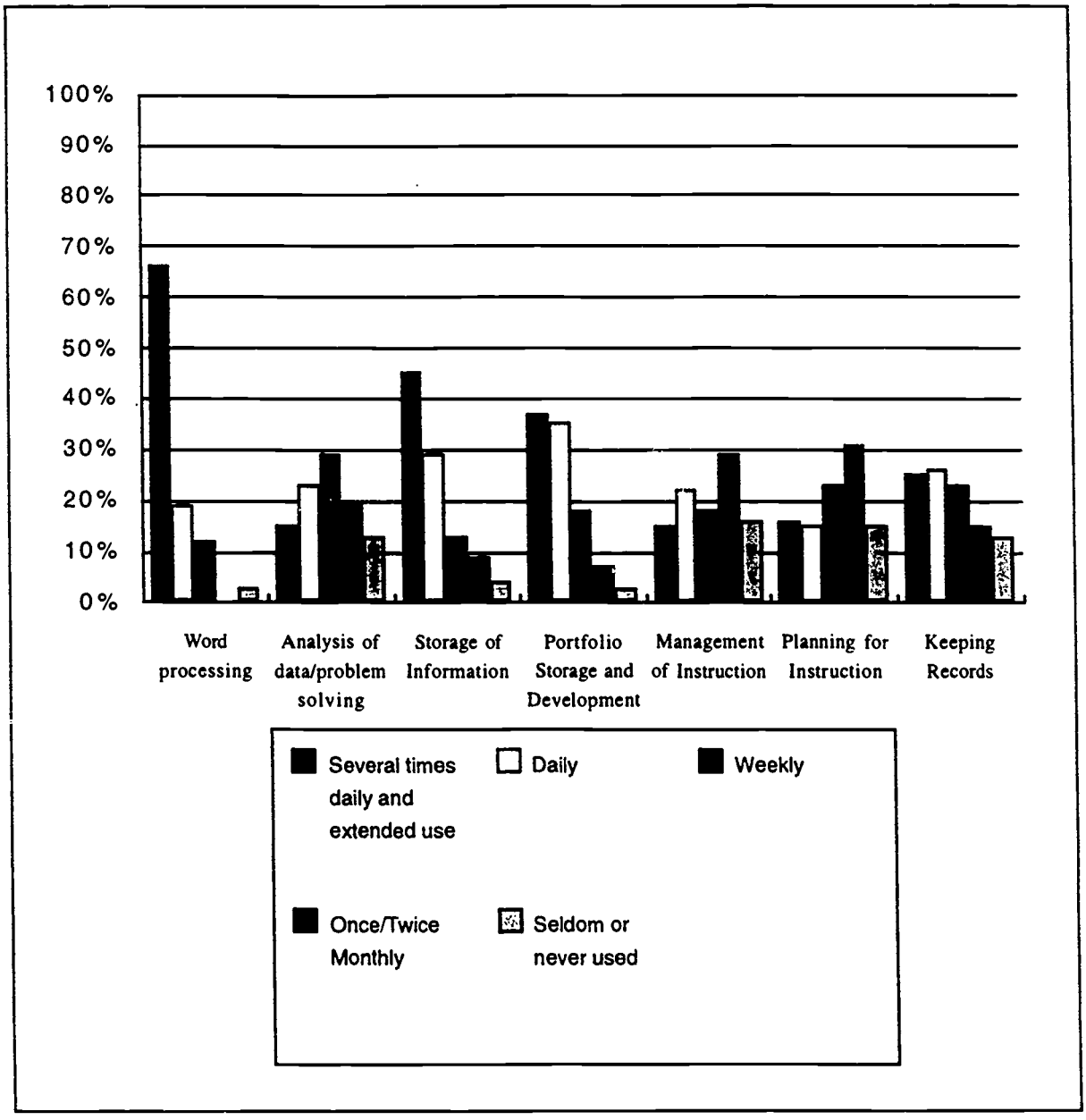


Figure 2
Study II: Self-Assessment Data
USES OF TECHNOLOGY IN INSTRUCTION



Discussion of Professional Development of School Staff

There is a high level of consistency between the district technology plans, the professional development plan, and the school transformation plan in both Study I and Study II. Alignment is supposed to exist among the plans and apparently it does. The DTCs, however, reported a 16 percent higher rating in the unacceptable range than the researchers, perhaps because they are more familiar with the coordination between plans and actual practice.

Between one-half and one-quarter of schools reported a variety of professional development opportunities throughout the year. This means that one-half to three-quarters of schools are not providing options that meet the needs of teachers. Here again, the DTCs are more critical than the university observers, reporting 15 percent more schools at a highly unacceptable level of professional development options.

Flexible scheduling of training options occurs in one-half to two-thirds of schools in Study I and Study II. Clearly, the lack of flexibility in scheduling in up to one-half of schools has implications for the access to training and its effectiveness.

From one-half to two-thirds of schools were judged to integrate the design of technology training with other professional development activities. This appears high given the fact that use of specific software applications in instruction is somewhat limited. It will be important to determine why there is not more use of technology in instruction if most of the schools integrate technology training in professional development activities.

TABLE 5

Percent of Schools at Different Levels of Implementation for the Subcomponents of Professional Development of School Staff Study I N= 24 Schools, Study II N=107 Schools

	A	B	C	D
Consistency Among Professional Development Plan/Technology Plan/ School Transformation Plan	All three plans are well correlated and fully address needs identified in the school technology plan.	Plans are partially correlated. Professional development activities somewhat address the needs identified in the school technology plan.	Plans have little correlation. Professional development activities slightly address the needs identified in the school technology plan.	Plans have no correlation. Professional development activities do not address the needs identified in the school technology plan.
Study I	67%	33%	0%	0%
Study II	46%	38%	15%	1%
Professional Development Options in Technology	A rich array of professional development options are available to school personnel, parents, and support staff.	A variety of professional development options are available to teachers and support staff.	Several professional development options are available to teachers, administrators, and staff throughout the year.	One or two planned training options are made available to teachers each year.
Study I	25%	50%	21%	4%
Study II	26%	33%	26%	15%
Scheduling of Training Options	Professional development is ongoing with a rich variety of options designed to meet individual schedules and needs.	A variety of professional development opportunities are scheduled throughout the year.	Professional development options for technology are scheduled several times each year.	Training scheduling is sparse and inflexible.
Study I	30%	32%	16%	21%
Study II	22%	32%	29%	17%
Design of Technology Training	A	B	C	
	Technology training is integrated into professional development activities addressing other areas.	Technology training occurs independently of other topics.	Technology training does not occur during the year.	
Study I	63%	37%	0%	
Study II	48%	49%	3%	

TABLE 6

Percent of Schools at Different Levels of Implementation for the Subcomponents School Technology Committee: Function & Process Study I N=24 Schools, Study II N=107 Schools

Composition of the School Technology Committee				
	A	B	C	D
	The committee represents all stakeholders.	The committee represents most stakeholders.	The committee represents only a few stakeholders.	The committee does not exist.
Study I	21%	71%	8%	0%
Study II	25%	61%	13%	1%
Development of the School Technology Plan				
	A	B	C	D
	The School Technology Action Plan is a product of the committee in collaboration with all stakeholders.	The committee has some input into the School Technology Action Plan.	The committee reviewed the School Technology Action Plan.	The committee had little or no input into the School Technology Action Plan.
Study I	50%	37%	9%	4%
Study II	58%	32%	7%	3%
Involvement in Decision Making				
	A	B	C	
	The committee is directly involved in the functioning of school-based decision making councils, school transformation committee, & professional development planning.	The committee has some input into the functioning of school-based decision making councils, school transformation committee & professional development planning.	The committee does not have input into the functioning of school-based decision making councils, school transformation committee & professional development planning.	
Study I	21%	66%	13%	
Study II	40%	46%	14%	

Discussion of School Technology Committee: Function and Processes

Most schools (nearly 90%) in both Study I and Study II have school technology committees that are representative of community stakeholders and that have input into the School Technology Action Plan. These functions are mandated by KETS and there is excellent progress toward full implementation. It is important to note these levels of representation and input may exist "on paper" and may not reflect the level of actual participation and/or the kinds of input provided by the school technology committee. For example, input may entail relatively low levels of input such as the reading of or commenting on a professional development plan or the input may be more involved throughout the entire planning process.

Between one-half and two-thirds of schools report the technology committee has some input into the functioning of school-based decision making, but only 21 percent of Study I schools and 40 percent of Study II schools report direct representation in site-based decision making. These levels of involvement in actual decision making, as opposed to planning, may have implications for implementing plans. Since site-based councils must allocate resources for KETS, the nearly 15 percent of schools that have no input into school-based decision making may not be able to secure the needed funds to implement education technology needed for the school.

Observers in both studies also examined aspects of the School Technology Coordinator (STC) position. Each school is mandated to have a STC, but no guidelines are provided as to the qualifications of the STC or the selection process. The STC is designated as the convener of the School Technology Committee and as the technology troubleshooter in the school, regardless of skill level or expertise. Since the position is pivotal to implementation, the observers inquired about compensation for the STC, if additional training was available, the extent of involvement in decision making, and if the STC was actually involved in either providing training to school staff or in instructional planning that integrated technology. Table 6A shows that two-thirds of the School Technology Coordinators are compensated. Observers determined that the primary compensation is release time. However, over 80 percent of schools in both Study I and Study II report the STC receives no additional training, is not involved in school decision making and does not have any official responsibility for instructional issues.

Implications of these findings suggest that the benefits to the implementation process of education technology would be enhanced if more attention was given to professional development of the STCs and if they became a more integral part of the instructional team in schools.

TABLE 6A

Information on Aspects of the School Technology Coordinator Position

Compensation for the School Technology Coordinator

	YES	NO
Study I	65%	35%
Study II	63%	37%

Additional Opportunities for the School Technology Coordinator

Additional Training

	YES	NO
Study I	8%	92%
Study II	5%	95%

Decision Making

	YES	NO
Study I	20%	80%
Study II	16%	84%

Responsibilities on Instructional Issues

	YES	NO
Study I	17%	83%
Study II	21%	79%

TABLE 7
Percent of Schools at Different Levels of Implementation for the Subcomponents of KETS Resources
Study I N=24 Schools, Study II N=107 Schools

The Library Media Center				
	A Full access and throughout school to electronic instructional materials, on-line search services, Internet, & electronic catalogue and circulation.	B Some access and throughout school to electronic instructional materials, on-line search services, Internet, & electronic catalogue and circulation.	C Limited access and throughout school to electronic instructional materials, on-line search services, Internet, & electronic catalogue and circulation.	D No access and throughout school to electronic instructional materials, on-line search services, Internet, & electronic catalogue and circulation.
Study I	8%	33%	55%	4%
Study II	15%	22%	36%	27%
Phones in Classrooms				
	A There are phones in all classrooms.	B There are phones in some classrooms with access to a phone at a nearby room or location.	C There is access to a phone at a nearby location.	D Teachers have no access to phones from their classrooms or at a nearby location.
Study I	4%	4%	46%	46%
Study II	10%	12%	53%	25%
Central Office Network Technology				
	A Office is on the KETS Wide Area Network.	B Office is currently being wired to the KETS Wide Area Network, software is being installed.	C Office is not on the KETS Wide Area Network.	
Study I	29%	50%	21%	
Study II	63%	26%	11%	
Central Office Networking Software				
	A Office personnel use Microsoft Office & MUNIS (District Administrative Software DAS).	B DAS software is installed, personnel are in process of being trained, some use is evident.	C Office does not have DAS software.	
Study I	29%	54%	17%	
Study II	37%	44%	19%	

Discussion of KETS Resources

There were mixed results regarding the extent of implementation of KETS resources reported for both study samples. Whereas the subcomponents of Central Office Network Technology and Software met current expectations, this was not the case for instruction-related services. About 60 percent of schools in both study samples have limited or no access to school-wide electronic instructional materials, on-line search services, Internet and electronic catalogue and circulation of library materials. Also, less than one in four teachers had a phone in the classroom or access to a phone at a nearby room or location.

On the other hand, central office installation and use of the wide area network and district administrative software (DAS) was very high. A strong majority (79% Study Sample I, 89% Study Sample II) reported the central office is on the KETS wide-area network or the office currently being wired and software installed. Training in the use of these systems is proceeding accordingly. Twenty-nine percent of Sample I and 37 percent of Sample II report the District Administrative Software (Microsoft Office and MUNIS) is currently in use. Nearly half of both study samples report the District Administrative Software is installed and personnel are being trained in its use.

Thus while the implementation of Central Office Networking appears to be making excellent progress, providing teachers simple tools of communication such as phones in the classroom and electronic instructional materials in the school media center are clearly lagging behind other implementation subcomponents.

TABLE 8

Percent of Schools at Different Levels of Implementation for the Subcomponents of Support for KETS (including the community) Study I N=24 Schools, Study II N=107 Schools

Group Support for KETS Implementation				
	A	B	C	D
	There is broad documented support for KETS from all stakeholders.	There is documented support for KETS from a majority of stakeholders.	There is documented support for KETS from some stakeholders.	Documented support from stakeholders is lacking.
Study I	12%	48%	28%	12%
Study II	30%	46%	20%	4%
School-Based Activities That Support KETS				
	A	B	C	D
	There is a broad array of activities that build awareness and support for KETS.	There are a significant number of activities that build awareness and support for KETS.	There are some activities that build awareness and support for KETS.	There are very few activities that build awareness and support for KETS.
Study I	8%	22%	54%	16%
Study II	13%	40%	32%	15%

Discussion of Support for KETS (Including the Community)

While there was very adequate documented support for KETS in a majority of schools (60% Study Sample I, 76% for Study Sample II), school-based and community efforts to build awareness and support were found to be at an acceptable level in only one-third to one-half of schools. Data collected by the researchers/observers in both study samples used checklists to note the types of evidence for school and community activities to build awareness and support for KETS. The most frequently reported support activity was the computer loan programs that give teachers additional technology support and enable them to practice their technology skills or learn to use new programs at home over the summer.

Community outreach efforts for KETS were sparse. Except for newsletters to inform parents and the public of technology projects and acquisitions and "open house" nights at school, activities to gain community support were very limited. Thus, while involved stakeholders, (e.g., school board and school council members) may be informed, activities to develop wider awareness and support for KETS in the community at large is lacking.

Rater Reliability Between University Researchers and District Technology Coordinators

For 14 schools both the University Researchers (Study I) and the District Technology Coordinators (Study II) independently collected data and provided ratings on the 20 subcomponents of the Education Technology Configuration Map. A percent of the agreement was computed for each item and for all items for different raters on the same school. Percent agreement was calculated as the ratio of the number of matches in ratings to the total possible x 100.

The proportion of exact agreements on ratings between University researchers and DTCs on all 20 subcomponents for the 14 schools to all possible ratings was 56 percent. That is, both university and district rates agreed on a rating of "A", "B", "C", or "D" for the components of the same school 56 percent of the time. However if one uses the categories of "acceptable practice" (rating A or B) and "need improvement" (rating C, D, or E) the proportion of matches between university and district rates to all possible ratings increased to 76 percent. Given the condition that this was the first time the configuration maps were used and training was not extensive, the reliability was considered quite promising. With more training and experience the configuration map does show promise for research as well as for self-report data under low-stakes conditions where consequences for performance are not involved.

Analysis of Subcomponents Related to High Implementation of Technology Components

To identify which subcomponents of the Education Technology Component Configuration Map are most critical to high implementation, a series of Spearman Rank-Order Correlation Coefficients were computed for both Study I and Study II. The higher the correlation coefficient, the more important the subcomponent as an indicator of high implementation. The lower the correlation coefficient, the less likely the subcomponent is a predictor of high implementation. Table 9 presents the Spearman correlation coefficients of subcomponents of the technology instrument from Study I: External Evaluation. The results are reported in descending order to show which subcomponents were most strongly associated with high implementation.

TABLE 9

Spearman Rank-Order Coefficients for Study I: External Evaluation

Technology Subcomponent	Spearman Coefficient	Probability
Scheduling of technology training options	.728	.0001
Availability of software applications	.718	.0001
Extent of technology-rich environment	.700	.0001
Professional development options in technology	.630	.0010
Extent to which technology is used in the instructional process	.614	.0014
Professional development of the school technology coordinator	.593	.0022
Development of school technology action plan	.573	.0034
Involvement in decision making	.561	.0043
Technology availability to individuals	.495	.0092
Design of technology training	.495	.0139
Consistency of available technology with the school technology action plan	.445	.0292
Composition of the school technology committee	.413	.0449
School-based activities in support of KETS	.401	.0516
Library Media Center	.358	.0851

If one considers those items in Table 9 with the highest Spearman Coefficient (i.e. .600 and above) it is evident that (a) how schools address professional development, (b) what school are doing to provide a "technology-rich" environment for students and teachers, and (c) the extent to which school are using technology for instruction determine their overall progress toward fully benefiting from education technology.

Table 10 presents the Spearman Correlation Coefficients of subcomponents of the technology instrument used in Study II: Self-Assessment. The results are reported in descending order to show which subcomponents were most strongly associated with high implementation.

TABLE 10
Spearman Rank-Order Coefficients for the Self-Assessment Sample

Technology Subcomponent	Spearman Coefficient	Probability
Extent of technology-rich environment	.752	
Scheduling of technology training options	.714	.0001
Available software applications of technology	.709	.0001
School-based activities in support of KETS	.706	.0001
Professional development options in technology	.705	.0001
Extent to which technology applications are used in the instructional process	.697	.0001
Involvement of the School Technology committee in decision making	.641	.0001
Design of technology training options	.598	.0001
Consistency of professional development plan/school tech plan	.585	.0001
Professional development of the school tech coordinator	.585	.0001
Development of school technology action plan	.545	.0001
Group support for KETS in the community	.530	.0001
Library Media Center	.503	.0001
Consistency of available technology with the school technology plan	.499	.0001
Composition of the school technology committee	.480	.0001
Technology availability to individuals	.479	.0001
Phones in classrooms	.386	.0001
Central Office Technology DAS	.237	.0137
Central Office Technology KETS (WAN)	.101	.2971

Based on the data in Table 10, Study II confirms that subcomponents related to professional development, providing a technology-rich environment, and the use of technology for instruction are critical factors for high implementation. If one again considers all items with a Spearman Coefficient of .600 and above, five subcomponents are identical for Study I and Study II. These are:

- Extent of a technology-rich environment
- Scheduling of technology training options
- Availability of software applications
- Professional development options
- Extent to which technology applications are used in the instructional process

Data from both the Study I and Study II samples suggest that implementation is related to factors that affect the individual teacher and the classroom environment rather than factors that relate to the administrative aspects of implementation such as consistency of technology with the technology plan or the composition of the school technology committee. For example, a technology-rich environment and flexible scheduling of training options directly affect classroom structures. The components least associated with higher implementation are those which are associated with school structures such as the compo-

sition of the school technology committee and central office technology. Interestingly, the components with higher Spearman Correlation Coefficients are those in which individual schools have more direct input into the decision-making process (such as scheduling professional development). For instance, principals interviewed for this research noted that there is some difficulty planning for the KETS match. Other principals were concerned about meeting the costs of implementing KETS.

A notable difference between the two samples is that in Study I: External Evaluation schools the school-based activities in support of KETS appears to be less of an indicator of high implementation than in the Study II: Self-Assessment schools.

Comparison of High and Low Implementors For the Two Study Samples

The patterns of implementation for the highest-scoring group of schools in both samples were compared with those of the lowest-scoring group of schools. This comparison was accomplished using data from a cluster analysis that showed patterns within the entire set of Configuration Map scores. The clustering process yielded distinct groups of schools whose scores differed from each other. These groups were labeled high, medium, and low implementors of the KETS initiative. Two groups were of special interest: the highest scoring schools (Study I N= 8; Study II N=37) and the lowest-scoring schools (Study I N=8, Study II N=37).

Differences in implementation patterns are very obvious when one compares the collective patterns for high-implementing and low-implementing schools on specific subcomponents. To illustrate this Figure 3 shows the implementation patterns of the 8 high-implementing schools in Study I and the 8 low-implementing schools for the subcomponent, "Technology Support for KERA Initiatives." The high implementors show very few unacceptable practices and a high proportion of recommended best practices. On the other hand, the low implementors show a substantial number of unacceptable practices and few recommended best practices. These data clearly indicate where growth is needed for the low implementors.

A second example is presented in Figure 4 which shows the implementation patterns for high implementing and low implementing schools in Study II for the subcomponent, "Professional Development of School Staff." Again, the differences are clearly showing what patterns need to be eliminated and which need to be embraced for low-implementing schools. Graphical comparisons of high and low implementors for other subcomponents for both Study I and Study II are presented in Appendix D.

Figure 2
Comparison of High/Low Implementors for
Study I: External Evaluation Data
KETS Resources

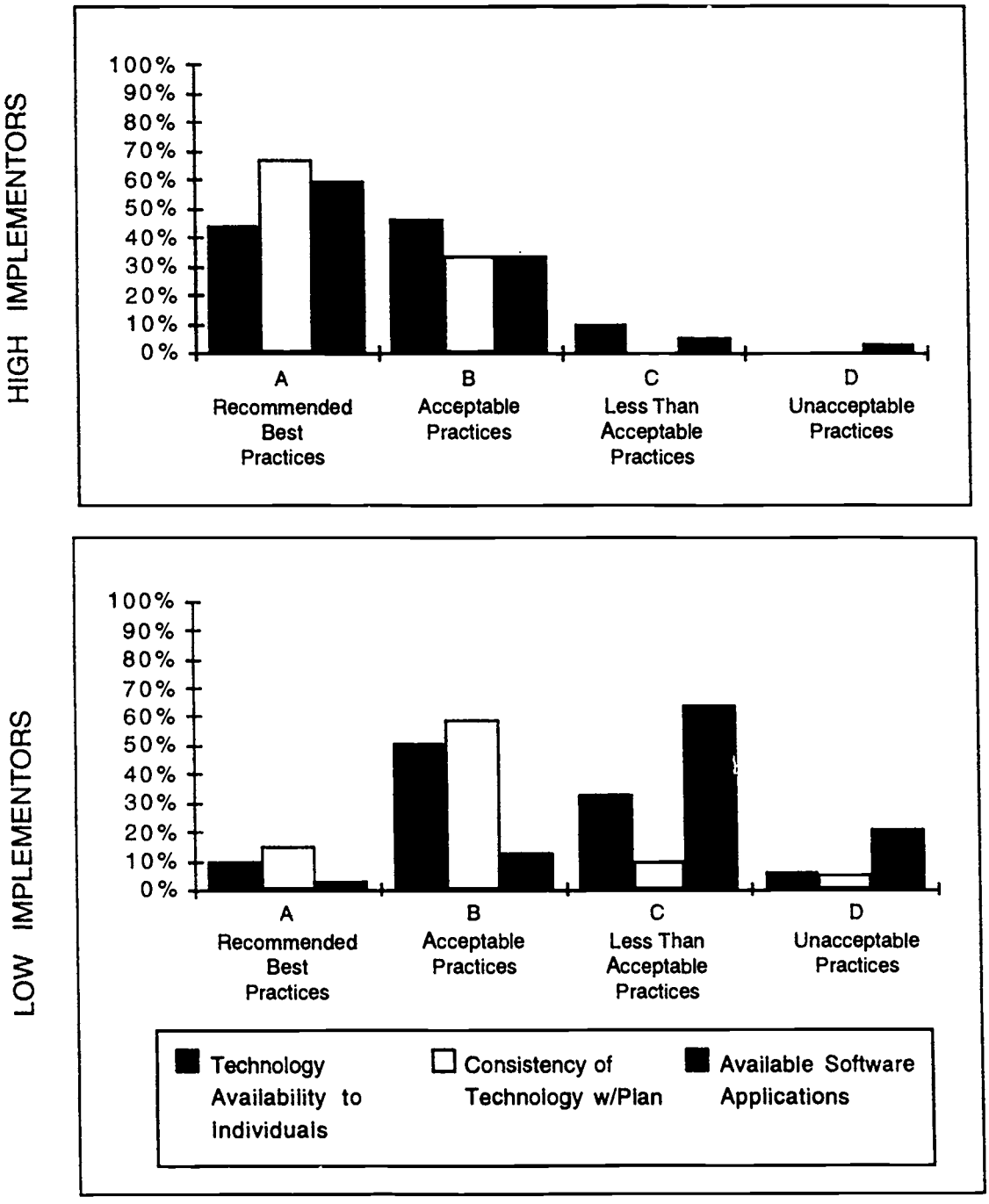
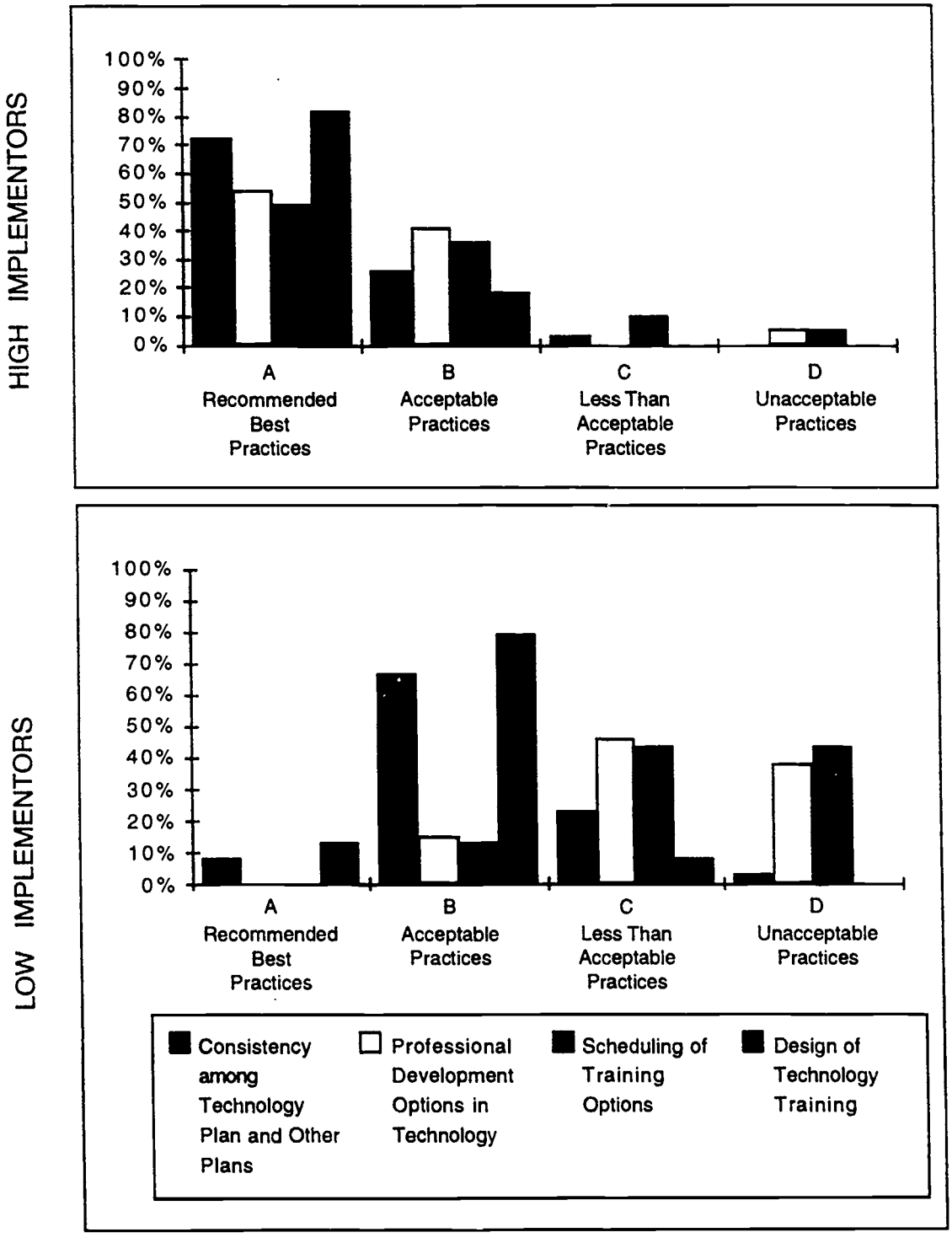


Figure 4
Comparison of High/Low Implementors for Study II: Self-Assessment Data Professional Development of School Staff



Results of the Interviews From Sample I: External Evaluation Only

Interviews with principals were conducted to provide additional important information regarding implementation that can not be considered as a variation in practice, but might nonetheless affect implementation. For example, did principals view technology in a supportive role vis-a-vis implementation of professional development or other KERA initiatives? Do teachers report changes in their instructional practices as a result of technology? These data may provide insights into implementation and suggest other areas that need to be examined.

Four of the 20 principals noted that their schools received rewards and they believed technology affected those results positively, especially in the area of final products for portfolios. Seven stated their schools were at or slightly below threshold and believed that students who use computers develop more serious attitudes about their portfolio products and that teachers are challenged to use newer tools and programs to enhance instruction. There appeared to be no patterns of technology supporting team teaching based on principals' answers to questions relating to this area of instruction.

All but two principals stated their schools were on schedule and diffusion was proceeding according to their technology plans. The two others commented about the extensive difficulties of networking their old school buildings. One said, "Between trying to figure out how to do it, and then when we do, figuring out how to pay for such a massive undertaking it is discouraging.... We are really struggling with wiring."

Two principals said they were not computer literate and did not use computers. Two others said they were novices but "much better than last year." The remainder are regular computer users, and noted several ways technology supports them in their work.

Teachers were asked if their instructional practices had changed as a result of technology. Four teachers reported no change or little change in practice. Twenty teachers responded in ways that indicated technology was changing their roles in the classroom. One teacher, whose comment was typical of this group said, "I'm less of a lecturer and more of a facilitator." Technology was increasing instructional resources for use by them or their students for 15 teachers in this group. Eleven teachers described the benefits of technology to increase efficiency in record keeping, grading and other management tasks. Six of these teachers alluded to the responsibility they felt to prepare students for a technological world, even if, as one respondent complained, "...it drives me crazy in the process!"

Also we asked teachers if training and professional development was adequate to address their classroom needs. The sample was split. Twenty-six reported it was satisfactory and that they were using technology skills learned in their teaching. Twenty-four described difficulties with professional development.

Time to practice with computers, difficulty implementing the skill using their own classroom equipment which was different than equipment actually used in trainings, and lack of personal self-confidence were the most critical problems identified. Six teachers interviewed were particularly disgruntled about training. One said it was "useless;" another was frustrated because the software and hardware she had received training on were not available to her in her school; and, another was frustrated because she had no time to practice the skills she had learned. She could not become competent enough to use these in her teaching, even though she was willing to do so. Four out of six reported that technology had little or no effect on their practice.

CONCLUSIONS FOR STUDY I: EXTERNAL EVALUATION

1. Schools across Kentucky have shown significant progress in building the capacity to make technology and technology networks available to students, teachers and administrators. All Districts are connected to the KETS network.

2. Statewide, schools have made the most progress in implementing aspects of KETS related to school structures of planning and organization:

- implementing technology that is consistent with the school's technology plan,
- implementing technology planning committees that represent all stakeholders,
- developing plans for technology and professional development that are consistent with the school's Transformation Plan

3. There were wide variations in the extent of implementation of the 20 identified subcomponents of education technology and KETS among the 24 schools studied. These differences were most evident in the use of technology applications and options available for professional development.

4. While there has been an increase in the applications of technology for instruction, a significant effort for development and training will be needed for technology to reach its full potential as a tool for teaching and learning. Word processing received considerable use in the study schools. Spreadsheets and databases are beginning to be a part of regular instruction and telecommunications was rarely observed being used for instruction or communication.

5. Basic classroom connectivity is deficient. Phones in classrooms or connections to Internet services are lacking in most schools.

6 Factors that differentiated schools that were high implementors of education technology from low implementors were related directly to classroom instruction and professional development:

a) The flexible scheduling of training options.
b) The availability of software applications to individuals.
c) The extent to which there was a technology-rich environment.
d) Professional development options in technology.
e) The extent to which technology is used in the instructional process.

- About one-half (49%) of schools identified as high implementors provided flexible scheduling of training options such as flexible professional development.
- Almost two-thirds (60%) of high implementors provide a wide range of software to students and teachers for use in teaching and management activities.
- About three-quarters (72%) of high implementors provide a technology-rich environment where students have flexible access to technology and cooperate on computing tasks ranging from technical assistance to learning activities.
- Over half of high implementors (53%) provide a range of professional development options in technology including but not limited to coaching, mentoring, specialized workshops, and individual tutorials that are provided throughout the year.
- Approximately one-third (33%) of high implementors report that technology is used as an integral part of the instructional process. Primarily classroom use is limited to word processing programs and, to a lesser extent, speadsheets and databases.

High implementation appears to be related to components of KETS that focus on classroom instruction and professional development of classroom teachers. Components that relate to school structures such as the development of a technology plan or the composition of the school technology committee seem less important as indicators of high implementation.

7 . While professional development was found to be associated with high implementation of education technology, only one-quarter (25%) of schools in the sample are providing a rich array of professional development options and only one-third overall (30%) provide ongoing, flexible professional development suited to individual needs.

8. Principals are generally positive about the potential of technology and committed to providing students with technology. However, many are frustrated and apprehensive regarding the time needed to develop technological expertise and how to obtain the needed matching dollars to be eligible for KETS funds. Teachers also were posi-

tive about the possible applications of technology to instruction and believed it was essential that students have access to technology to prepare them for an increasingly technological workplace. Like the principals, teachers were frustrated with the lack of time to learn to use computers. Teachers who used technology more extensively reported changes in their teaching practices that provided more support of active student learning and less direct teaching methods such as lecturing.

9. The Innovation Component Map for Education Technology proved to be a useful instrument for gathering data on the variations of practice that exist in Kentucky schools related to the implementation of Education Technology. The reliability data comparing the ratings of external researchers and district technology coordinators were encouraging for the first-time use of a qualitative instrument. Feedback from researchers provided useful data to revise and improve the Configuration Map for Education Technology.

CONCLUSIONS FOR STUDY II: SELF ASSESSMENT

1. The results of Study II confirm that statewide schools have made significant progress in making technology hardware and software available to students, teachers, and administrators. In addition, all Districts have connected to the KETS network which supports the capacity to network among schools in the district and to connect to state and national networks.

2.. As in Study I, the 107 schools in Study II show the most progress in implementing components of education technology that relate directly to school structures of planning and organization:

- implementing technology that is consistent with the school's technology plan,
- implementing technology planning committees that represent all stakeholders, and
- developing plans for technology and professional development that are consistent with the school's Transformation plans.

The internal evaluators (DTCs) of Study II judged their technology somewhat less consistent with school plans than the external evaluators judged the technology of schools in their study. The Study II schools were more effective than Study I schools at informing the public about KETS activities. Over half the schools in the sample reported a significant number of public information activities.

3. The results of data collected by local technology coordinators on schools in their districts showed a wide variation in practice across schools on the 20 subcomponents addressed the Configuration Map for Education Technology. As in Study I, the differences in patterns of implementation were most pronounced in the use of tech-

nology applications and options available for the professional development of teachers and administrators.

4. The availability of applications of technology for instruction were rated somewhat higher for schools in Study II than for Study I. However, based on the data, schools in Study II also will require much more training and professional development to reach their full potential in providing technology as a tool for instruction. As in Study I, Word Processing software is used extensively for writing and portfolio development. Databases and spreadsheets are beginning to be incorporated into instructions, with telecommunications at the awareness and exploratory stage.

5. Basic classroom connectivity in Study II schools was deficient; however, the DTC observers in Study II reported somewhat more access to phones than Study I schools. Overall, phones in classrooms or connections to Internet services are lacking in over three-quarters of Study II schools.

6. Several factors were associated with high implementation of education technology:

a) the technology available to individuals,
b) the consistency of the available technology to the school technology plan,
c) the availability of software applications,
d) the extent to which there was a technology-rich environment, and
e) the extent to which technology is used in the instructional process.

- Just under one-half (45%) of schools identified as high implementors provided a wide range of technology available to individual teachers and students for learning and management activities.
- Almost three-quarters (72%) of high implementors report a high consistency of available technology with the school's technology plan, indicating that in this group of schools technology is not only present, but used in implementing other areas of KETS as well.
- About two-thirds (59%) of high implementors provide a wide array of software applications for use in teaching, learning and management.
- Just under three quarters (72%) of high implementors report that they provide a technology-rich environment in which students have flexible access to computers and assist each other in a variety of cooperative tasks.
- Just over one-third (37%) of high implementors report that technology is used as an integral part of the instructional process. Primarily classroom use is limited to word processing programs and, to a lesser extent, speadsheets and databases.

High implementation in the Study II sample seems to be highly correlated to components of KETS that focus on classroom instructions and individual teachers. Components that relate to school structures such as the composition of the school technology

committee seem less important indicators of high implementation. Based on the similar data from both Study I and Study II regarding indicators of high implementation it appears that components that focus on school structures are necessary but not sufficient factors for high implementation of education technology.

7. While professional development options for teachers was one of the critical factors related to high implementation of education technology, only 26 percent of schools were judged to have a rich array of options available to school personnel and parents and 41 percent of schools were judged to have professional development programs that were "less than acceptable" as defined by the Configuration Map. Also, half (49%) of Study II schools reported technology training independent of and not integrated with other professional development related to instruction.

8. The ICC Map was a useful tool for these data collectors to assess the status of implementation in their districts. The district technology coordinators generally rated schools slightly below the ratings of the university observers, demonstrating that DTCs can be critical in self-reports about the conditions that exist in their schools under conditions that are nonthreatening and not used for public evaluation.

9. The use of Kentucky's two-way video teleconferencing network was an efficient and cost-effective method of training data collectors. In the relatively short 1/2 day training, the DTCs were able to report findings that correlated 76 percent of the time with professional researchers. The cost-benefit analysis is very favorable. Rather than paying upwards of $2,000.00 for travel and expenses, the video sites were available for less than $30/hour ($180.00).

RECOMMENDATIONS

1. The Kentucky Department of Education should identify schools that are high implementors and demonstrate exemplary practices in specific components of Education Technology. Strategies should be developed to disseminate successful approaches of implementation and utilize the expertise in high-implementing school to provide technical assistance to schools needing help.

2. All schools should conduct a self-assessment using the Configuration Map for Education Technology, or similar diagnostic instrument, to determine relatively strong components of Education Technology and specific components most needing attention. The Kentucky Department of Education should provide training in the use of the Configuration Map to all District Technology Coordinators.

3. Schools should focus more development and training efforts on broad applications of technology for instruction, specifically in the use of databases and telecommunications.

4. Schools should design professional development in Education Technology that provides more of a variety of options for staff throughout the year and that is integrated (a part of and not separate from) with other professional development efforts to improve instruction. Also, schools should make more use of networks to deliver on-line instruction and to promote information sharing among individuals.

5. The Kentucky Department of Education should identify and target schools that are low implementors for the purpose of providing assistance to upgrade resources and supporting equity in educational opportunities.

6. All schools should make networking – within their schools and with other schools - a high priority. The Kentucky Department of Education should make available to schools assistance in networking through the Regional Service Centers and through identified schools highly involved in networking.

7. School principals should involve School Technology Coordinators more directly as part of the school's instructional planning team for the purpose of using technology for instruction.

8. All schools need to develop and maintain more effective public information and outreach strategies to support the Kentucky Education Technology System (KETS).

SUGGESTIONS FOR FURTHER RESEARCH

These first implementation studies focused on the extent of implementation of Educational Technology in schools across the state. A continued effort of assessing extent of implementation using a common reporting instrument such as the Configuration Map is needed statewide. Under conditions of "low stakes" that are nonthreatening to local school, self-assessment by trained observers should be able to provide these data. This information statewide on an annual basis is needed to evaluate and monitor progress of education technology in schools across the state.

Beyond studies that focus on what is happening school-wide, studies that focus on the use of technologies in individual classrooms and patterns of use of technology for instruction by individual teachers are needed. For example, what are the variations in use of technology:

- in different subject areas (i.e., math, science, social studies, writing, the arts),
- across school levels (i.e., K-3, grades 4&5, grades 6-8, grades 9-12),
- at different size schools,
- for assessing students' learning and reporting progress?

Schools that are high implementors of education technology compared to low implementors should be studied to identify strategies that are most and least successful. Factors such as leadership, professional development, focus on instruction, support systems, and community involvement need to be examined.

Studies need to be conducted to determine the effects of technology on student learning and school management. Now that the Configuration Map has been pilot tested and a common measurement for implementation is available, the relationship of implementation to student learning or other school goals needs to be researched. Important to this cause-effect research will be the study of the effects of different levels of use of technology in schools while other contextual factors are the same or accounted for.

The origin of KERA was energized by the need to bring equality to schools across the Commonwealth. Studies are needed to determine how education technology has effected learning opportunities for students to increase the equity across all schools in Kentucky.

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APPENDICES

APPENDIX A

An Innovation Component Configuration Map for Educational Technology

AN INNOVATION COMPONENT CONFIGURATION MAP FOR EDUCATIONAL TECHNOLOGY

School:_____ Observer:_____ Date:_____

Number of active classrooms:_____ Number of students:_____ Number of teachers:_____

Please note:

This document was developed by the Kentucky Institute for Education Research for the purpose of studying the implementation of Educational Technology and is not to be used as an evaluation instrument. While it was designed as a research tool, this document can be used for planning and self-assessment of local patterns of implementation.

This document, known as a Component Configuration Map, identifies key components of Educational Technology and describes variations in practice one would expect to find across the state. The variations farthest to the left are considered by Kentucky practitioners, researchers, and developers to be the emerging practice advocated in the KERA initiative. Determining which is the most effective or efficient variation of practice will be the challenge of ongoing research.

The developers of this Innovation Component Configuration Map are periodically reviewing and revising this instrument to improve its usefulness and ability to identify important variations in practice. Please send all comments and suggestion to Roger Pankratz, Executive Director, Kentucky Institute for Education Research, 146 Consumer Lane, Frankfort, Kentucky 40601. Fax 502-227-8976.

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Table of Contents

A. Technology Support for KERA Initiatives 3
1. Technology availability to individual 3
2. Consistency with School Plan 4
3. Application of technology 4

B. Technology Used in the Instructional Process 7
1. The Learning Environment 7
2. Extent of technology application in the instructional process 7

C. Professional Development of School Staff 9
1. Consistency among the Professional Development Plan, the Technology Plan and the School Transformation Plan 9
2. Professional development options in technology 9
3. Scheduling of technology training option 10
4. Design of technology training 11

D. School Technology Committee: Function and Processes 11
1. Composition of school technology committee 11
2. Development of the School Technology Action Plan 11
3. The involvement in decision making 12
4. Professional development of the school technology coordinator 12
5. Compensation for the school technology coordinator 12
6. Additional opportunities for the school technology coordinator 12

E. Kentucky Education Technology System (KETS) Resources 13
1. The library media center 13
2. Phones in classrooms 13
3. Central office 14
F. Support for KETS 14
1. Group support for KETS implementation 14
2. School-based activities that support KETS 15

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A. Technology Support for KERA Initiatives
Circle the statement that most accurately applies.

1. Technology availability to individuals *(availability, variety)*

(a)

A wide variety of technologies is available for learning, management, and communication. Technologies are available in sufficient quantity to promote widespread use and include personal computers, telephone, V.C.R., camcorder, video disc, CD-ROM and information network access.

(b)

A selection of technologies is available for learning, management, and communication, but the selection is limited by either access to the technology or the number available. Technologies available include personal computers, telephone, V.C.R., camcorder, CD-ROM and information network access.

(c)

A limited number of technologies are available for learning, management, and communication. Access is difficult (e.g. phones available only in teacher's lounge) and includes few technology options, including only one or two of the following: personal computers, VCRs, camcorders, and/or information network access.

(d)

Few or no technology is available for learning, management, and communication. There are no (or only a few) phones in classrooms, no (or only a few) personal computers, camcorders, VCRs, etc.

Place a number in the space to indicate the extent of availability for different groups. Use the key to the right.

___Individuals with Disabilities
___Learners
___Teachers
___Principals
___Counselors
___Library media specialists
___Parents and community
___Support staff
___Other (Please describe)
_____
_____

Availability
4- Daily and for Extended Use Beyond School Day
3- Daily
2- Weekly
1- Occasionally
0- Not available

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62

2. Consistency of Available Technology with School Technology Plan*. Circle the statement that most accurately applies.

(a)	(b)	(c)	(d)
The technology present in the school fully reflects the diffusion of technology laid out in the school's current technology plan. For example, if computers are available only in labs, does this reflect the school technology committee's plan to spend KETS money on computer labs first, then on classroom computers in subsequent years?	The technology present in the school partially reflects the diffusion of technology laid out in the school's current technology plan. For example, it is evident from observation that the plan is being followed, but full implementation has not yet been reached.	The technology present in the school runs counter to the diffusion of technology laid out in the school's current technology plan. For example, labs were planned as the initial computer implementation and only classroom computer(s) are evident.	The technology present in the school indicated the diffusion of technology laid out in the school's current technology plan has not begun in any way.

* If more detailed information is needed, technology inventories are available in the district technology master plans.

3. Available Software Applications of technology *[variety of application, extent of use]*. Circle the statement that most accurately applies.

(a)	(b)	(c)	(d)
There is a broad array of software applications (more than 10) in use for instruction, information networking, research management and planning. Most school professionals, students and parents use basic productivity packages, CD-ROM reference materials, e-mail and HyperCard or linkway.	There is a variety of software applications (5-10) in use in the school for instruction, management and information networking. The majority (more than 2/3) of school professionals and students use productivity packages, CD-ROM reference materials, e-mail, grading packages, and HyperCard or linkway.	There are several applications (3-5) of technology in use for instruction and management. Some teachers and students (... /3). use basic productivity packages, C... ...erence materials, e-mail, grading packages, and HyperCard or linkway.	There are a limited number of applications (0-2) of technology in use in the school for instruction, research management, or communication. Only a few (1/3 or less) teachers and students use basic productivity packages, CD-ROM reference materials, e-mail, grading packages, and HyperCard or linkway. For this category, please note if circumstances such as lack of site license or server limitation is partially responsible for this low variety and extent of use.

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Place a number in the space to indicate the extent of use of each application for instruction or management by teachers.

Extent of Use
4- Daily and for Extended Use Beyond the School Day. Use the key to the right.
3- Daily
2- Weekly
1- Occasionally
0- Not Used

	(a) Curriculum & Instruction	(b) Performance Assessment	(c) Professional Development	(d) School-Based Decision Making	(e) Extended School Services	(f) Family Resource/ Youth Service Centers
Electronic instructional materials	___	___	___	___	___	___
Portfolio development storage	___	___	___	___	___	___
Telecommunication	___	___	___	___	___	___
Multimedia production	___	___	___	___	___	___
Data analysis and decision making	___	___	___	___	___	___
Scheduling	___	___	___	___	___	___
Instructional planning and management	___	___	___	___	___	___
Record keeping	___	___	___	___	___	___
Other technology applications: Please describe	___	___	___	___	___	___

_____ _____
_____ _____

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Place a number in the space to indicate the extent of use of each application for instruction or management by students.

Extent of Use
4- Daily and for Extended Use Beyond the School Day. Use the key to the right.
3- Daily
2- Weekly
1- Occasionally
0- Not Used

	(a) Curriculum & Instruction	(b) Performance Assessment	(c) Professional Development	(d) School-Based Decision Making	(e) Extended School Services	(f) Family Resource/ Youth Service Centers
Electronic instructional materials	___	___	___	___	___	___
Portfolio development storage	___	___	___	___	___	___
Telecommunication	___	___	___	___	___	___
Multimedia production	___	___	___	___	___	___
Data analysis and decision making	___	___	___	___	___	___
Scheduling	___	___	___	___	___	___
Instructional planning and management	___	___	___	___	___	___
Record keeping	___	___	___	___	___	___
Other technology applications: Please describe	___	___	___	___	___	___

_____

_____

*Please note any of these uses by parents or support staff in the space below (For example, parents use databases for school-based council work)

_____

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B. Technology Used in the Instructional Process
Circle the statement that most accurately applies.

1. Extent to which there is a technologically rich learning environment *[flexibility, extent of technology]*

(a)	(b)	(c)	(d)
Computers and other appropriate technology are located in areas that enable all students to have flexible access during instructional activities (this includes class work that may be occurring in labs). Students or groups of students can work in computer areas while other types of instructional activities occur. Students help each other.	Computers and other appropriate technology are located in areas that enable many (more than 2/3) students to have flexible access during instructional activities (this includes class work that may be occurring in labs). If students or groups of students work together in computer areas there is some disruption of other types of instructional activities. Students mostly help each other with some teacher assistance.	Computers and other appropriate technology are located in areas that enable only some (up to 1/3) students to have flexible access during instructional activities (this includes class work that may be occurring in labs). Students of groups of students can work in computer areas but this greatly disrupts other types of instructional activities. Teacher primarily helps students on the computers.	Computers and other appropriate technology are either not available at all or are located in an area that does not enable students to have flexible access during instructional activities. For example, the classroom has only one computer located in the front of the room at the teacher's desk or the student computer(s) is located in the center of the room and using it might disrupt other activities etc. Students or groups of students can not work in computer area while other instructional activities are occurring. No help is given if a student is using the computer.

2. Extent of technology application in the instructional process *[variety of applications, integration into ongoing instruction]*

(a)	(b)	(c)	(d)	(e)
A variety of technology applications are regularly used as ongoing elements in the instructional process.	Several technology applications are regularly used as ongoing elements of the instructional process.	One or two technology applications are regularly used to support and enhance instruction.	One or two technology applications are occasionally used to support and enhance instruction.	Technology applications are seldom used to support instruction.

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Place a number in the space to indicate the extent to which each technology application is used in day to day instructional processes. Use the key to the right.

Extent of Use
4- Several times each day and extended use
3- Daily
2- At least once or twice a week
1- Occasionally once or twice a month
0- Seldom or never used

___Word processing
___Analysis of data/problem solving
___Spreadsheets
___Databases
___Telecommunications
___Storage of information
___Multimedia production and presentation
___Electronic instructional materials
___Portfolio development and storage
___Management of instruction
___Planning for instruction
___Keeping records of student performance
___Other applications: Please describe:
_____
_____

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C. Professional Development of School Staff
Circle the statement that most accurately applies.

1. Consistency among the Professional Development Plan, the Technology Plan and the School Transformation Plan

(a)	(b)	(c)	(d)
All three plans are well correlated and support the same goals.	Professional development activities somewhat address the needs identified in the School Technology Plan.	Professional development activities slightly address the needs identified in the School Technology Plan.	Professional development activities do not at all meet the needs identified in the School Technology Plan.

2. Professional development options in technology *(availability, variety of options)*

(a)	(b)	(c)	(d)
A rich array of professional development options are available to school professionals, parents, and support staff.	A variety of professional development options are available to teachers and support staff.	Several training options in technology are available to teachers and administrators at specified times throughout the year.	One or two planned training options are made available to teachers each year.

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Place a number in the space to indicate the extent of availability for each of the professional development options. Use the key to the right.

Extent of Availability
3- Available upon request
2- Available once or twice each month
1-Available once or twice each semester
0- Not available

___Coaching
___KET programs
___Mentoring
___Desktop technology (tutorials)
___Independent study
___Internet resources
___Telecommunicating for professional development
___Video/audiotape training workshops
___Train the trainer development workshops
___Team study groups
___Formal academic courses
___Other options: (Please describe):
_____
_____

3. Scheduling of technology training options *[availability of options]*
Circle the statement that most accurately applies.

(a) Professional development is ongoing with a rich variety of options designed to meet individual schedules and needs.

(b) A variety of professional development opportunities are scheduled throughout the year.

(c) Professional development options for technology are scheduled several times each year.

(d) Professional development in the use of technology is limited to one or two scheduled workshops per year.

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4. Design of technology training *(integration of training)*

(a)	(b)	(c)
Technology training is integrated into professional development activities addressing other areas.	Technology training occurs independently of other topics.	Technology training does not occur.

D. School Technology Committee: Functions and Processes
Circle the statement that most accurately applies.

1. Composition of school technology committee *(representation, stakeholders include: individuals with disabilities, learners, teachers, principals, counselors, library media specialist, parents, community and support staff)*

(a)	(b)	(c)	(d)
The committee represents all stakeholders.	The committee represents most stakeholders.	The committee represents only a few stakeholders.	The committee does not exist.

2. Development of the School Technology Action Plan *(involvement of stakeholders)*

(a)	(b)	(c)	(d)
The School Technology Action Plan is a product of the committee in collaboration with stakeholders.	The committee had some input into the School Technology Action Plan.	The committee reviewed the School Technology Action Plan.	The committee had little or no input into the School Technology Action Plan.

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3. The involvement in decision making *[extent of involvement]*
Circle the statement that most accurately applies.

(a)	(b)	(c)
The committee is directly involved in the functioning of school-based decision making councils, school transformation process committees, and professional development.	The committee has some input into the functioning of school-based decision making councils, school transformation process committees, and professional development.	The committee does not have a process for working with school-based decision making councils, school transformation process committees, and professional development.

4. Professional development of the school technology coordinator (STC) *[extent of participation]*

(a)	(b)	(c)	(d)
The STC participates in a variety of instructional technology training opportunities.	The STC participates occasionally participates in instructional technology training opportunities.	The STC only participates in instructional technology training provided by the state.	No training opportunity is provided related to instruction technology.

5 Compensation for the school technology coordinator
[extent of compensation]
Place a check in the space indicating your response.

Does the school technology coordinator receive compensation through release time or salary?

___ Yes

___ No

Please explain: _____

_____ _____

6. Additional opportunities for the school technology coordinator
[extent of involvement]

Does the school technology coordinator receive opportunities for:

Additional training	Yes___ No___
Decision making	Yes___ No___
Responsibilities on instructional issues	Yes___ No___

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E. Kentucky Education Technology System (KETS) Resources

1. The library media center *[accessibility]*
Use a check to indicate the level of accessibility.

	(a) Full access in library and throughout school, and from home.	(b) Some access in library and throughout school, and from home.	(c) Limited access in library and throughout school, and from home.	(d) There is no access in library and throughout school, and from home.
Electronic instructional materials (software, CD-ROMs, laser discs)				
On-line research services				
Internet				
Electronic catalog and circulation				
Other: Please describe: _____				

2. Phones in classrooms *[accessibility]*
Circle the statement that most accurately applies.

(a)	(b)	(c)	(d)
There are phones in all classrooms.	There are phones in some classrooms with access to a phone from all classrooms.	There is access to a phone from classrooms.	Few if any teachers have access to phones from their classrooms.

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...nology Circle the statements that most accurately applies.

(a)	(b)	(c)
...TS Wide Area Network	Office is currently being wired to the KETS Wide Area Network, software is being installed	Office is not on the KETS wide area network

(a)	(b)	(c)
Office personnel use Microsoft Office and MUNIS (District Administrative Software-DAS)	DAS software is installed, personnel are in process of being training, some use evident	Office does not use DAS software.

F. Support for KETS

1. Group support for KETS implementation
(extent of support)
Circle the statement that most accurately applies.

(a)	(b)	(c)	(d)
There is broad documented support for KETS from all stakeholders.	There is documented support for KETS from a majority of stakeholders.	There is documented support for KETS from some stakeholders	Documented support from stakeholders is lacking.

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Place a number in the space to indicate the extent of support. Use the key to the right.

___District school board
___District administration
___District technology coordinator
___School principal
___School-based council
___Teachers
___Parents
___Students
___Community
___Other: (Please describe):
_____
_____

Extent of support
3- There are documented results from support
2- There are actions to support KETS
1- There is documented evidence of a plan to support KETS
0- There is little or no evidence of support

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2. School-based activities that support KETS *(number, variety)*
Circle the statement that most accurately applies.

(a)	(b)	(c)	(d)
There is a broad array of activities that build awareness and support for KETS.	There are a significant number of activities that build awareness and support for KETS.	There are some activities that build awareness and support for KETS.	There are very few activities that build support for KETS.

Place a check in the space to indicate the school-based activities that support KETS and describe the support.

___Computer loan programs	Description of Support:_____
___Student Technology Leadership Program	Description of Support:_____
___Business partnerships	Description of Support:_____
___Technology fairs	Description of Support:_____
___School volunteers	Description of Support:_____
___Newsletters	Description of Support:_____
___Media shows	Description of Support:_____
___Efforts to inform parents, community leaders, legislators	Description of Support:_____
___Other (Please describe):	Description of Support:_____

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APPENDIX B

Principal Interview

CODE_____

Principal Interview

1. How many students are there in this school?

2. How many primary classrooms are there in this school?

3. How many of the classrooms have:

   A Teacher Workstation?_____

   A Classroom Computer for Students?_____

   Meet the KETS 6:1 Student:Computer Ratio? _____

   A Telephone? _____

4. How many computer labs does your school have?

5. Is your school on track regarding the technology diffusion as set forth in your school technology plan?

6. What percentage of the children in your school are on free or reduced lunch?

7. How many of the teachers use technology ?

   ...For Instruction?

   ...For Management or Record Keeping?

8. Are there any teachers that work together as teams? If so, how many?

   How many teachers are there in the team?

Do these teachers use technology?

Do they plan together?

9. Have your teachers been trained in technology? What training have they had? Are they using technology more in their classrooms?

10. Do you use technology as the school administrator? How? Have you received training? Are you computer literate?

11. Does your school have a student technology leadership program? Does the school technology coordinator receive release time to do that job?

12. What were your school's assessment results?

(If the principal response indicates good assessment results, probe with the following: What impact do you think technology had on your assessment results?)

APPENDIX C

Teacher Interview

CODE_____

Teacher Interview

1. How have your instructional practices changed as a result of the technology program?

2. What effect has the technology had on your [discipline] e.g. social studies?

   What software/hardware/technology are you using for your instruction?

3. Have you had technology training? Are you using it?

   Was the training adequate to your classroom needs?

   [If not, probe regarding what training is needed... etc.]

4. Has your school begun SBDM?

   If yes, when?

   If yes, What impact did the council have on the technology program?

5. The technology program is based on several critical attributes. Which of those attributes have you found easiest to implement? Which have been the hardest?

[If some attributes are not mentioned, prompt with the following: You have mentioned (attributes mentioned in 5). How easy or hard have the others been?]

Critical attributes:

Meeting the needs of individual learners
Support for technology assessment
Technology support for inclusive instruction
Preparing students for a technological society
Preparing students to find and use information appropriately
Technology support for communication and collaboration

6. Does your school have a technology rich media center? In what ways do you use the school media center?

7. Is there anything else that you want to add regarding the technology program?

APPENDIX D

Comparison of High/Low Implementors for Study I and Study II Figures 5 –16

Figure 5
Comparison of High/Low Implementors for Study I: External Evaluation Data
KETS Resources

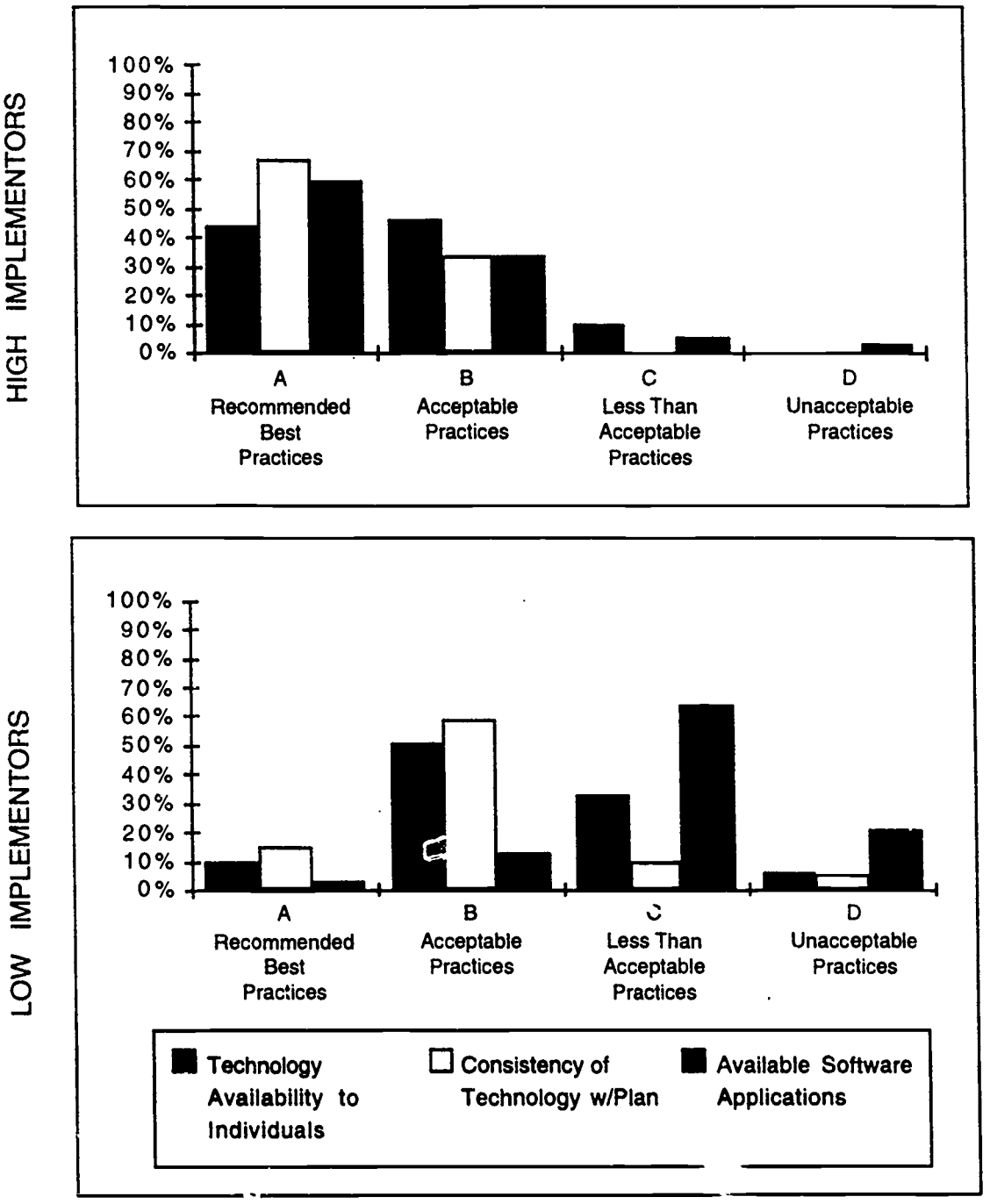

Figure 6
Comparison of High/Low Implementors for Study I: External Evaluation Data
Technology Used in the Instructional Process

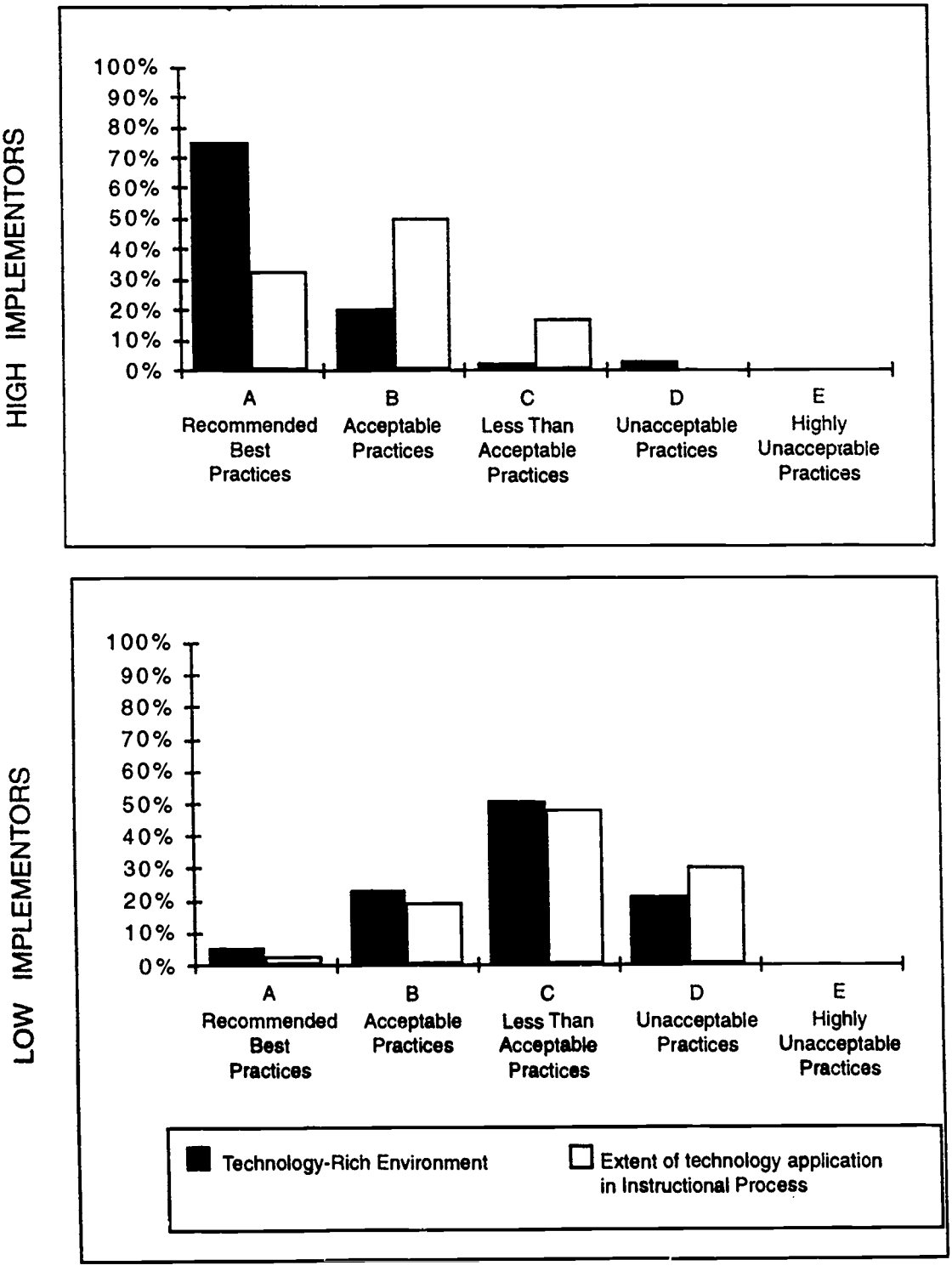

Figure 7
Comparison of High/Low Implementors for Study I: External Evaluation Data Professional Development of School Staff

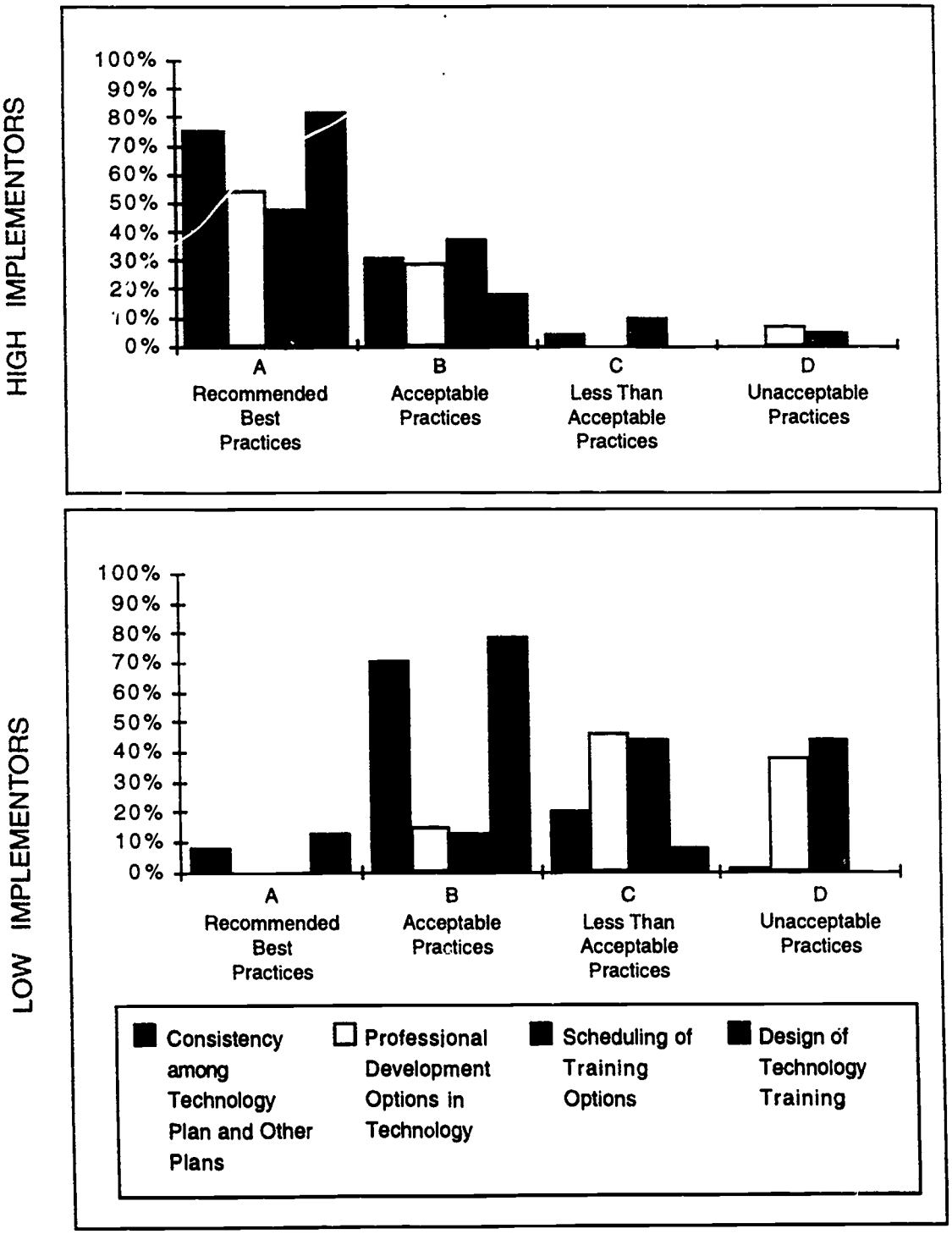

Figure 8
Comparison of High/Low Implementors for Study I: External Evaluation Data
The School Technology Committee: Function and Process

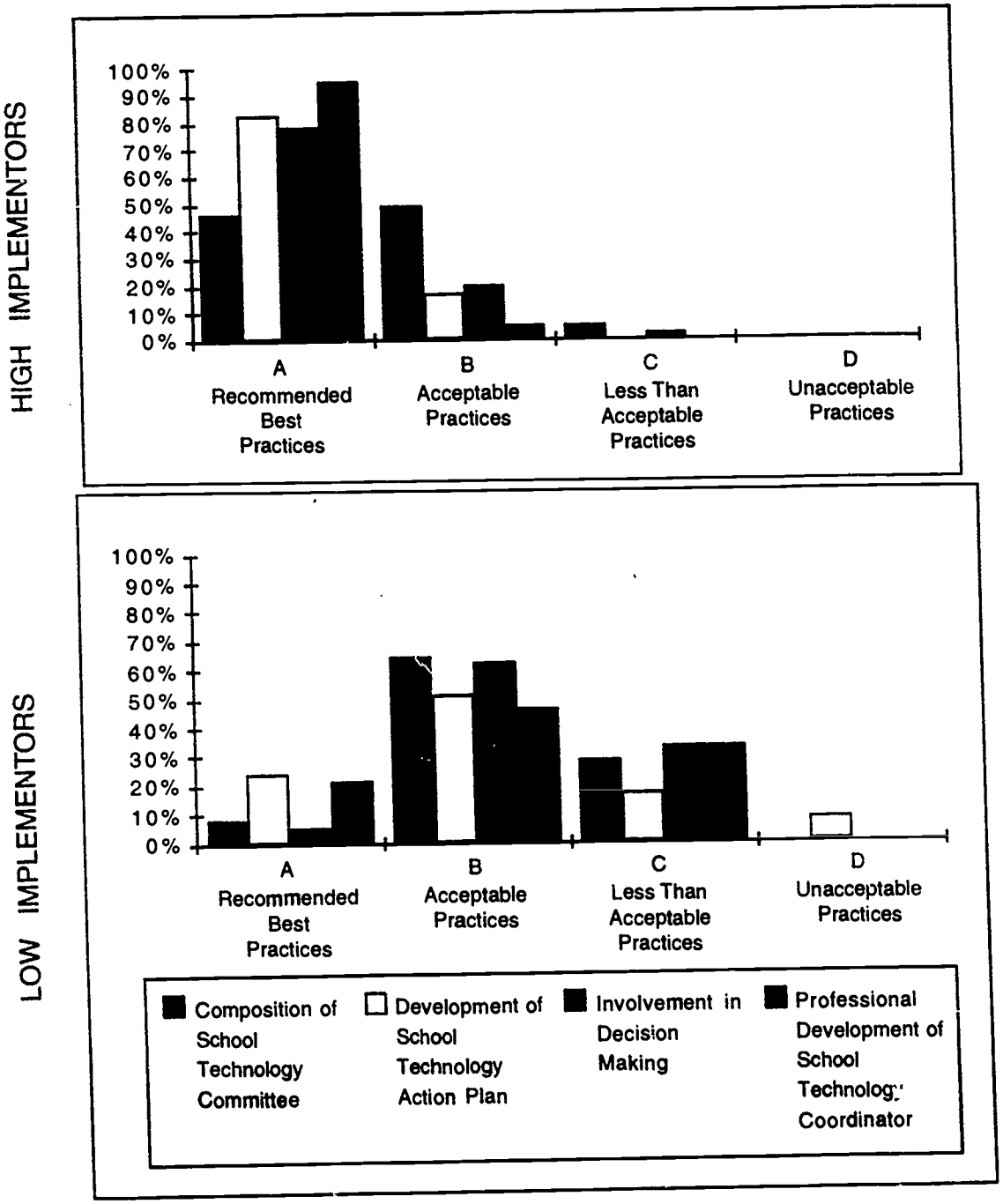

Figure 9
Comparison of High/Low Implementors for Study I: External Evaluation Data
KETS Resources

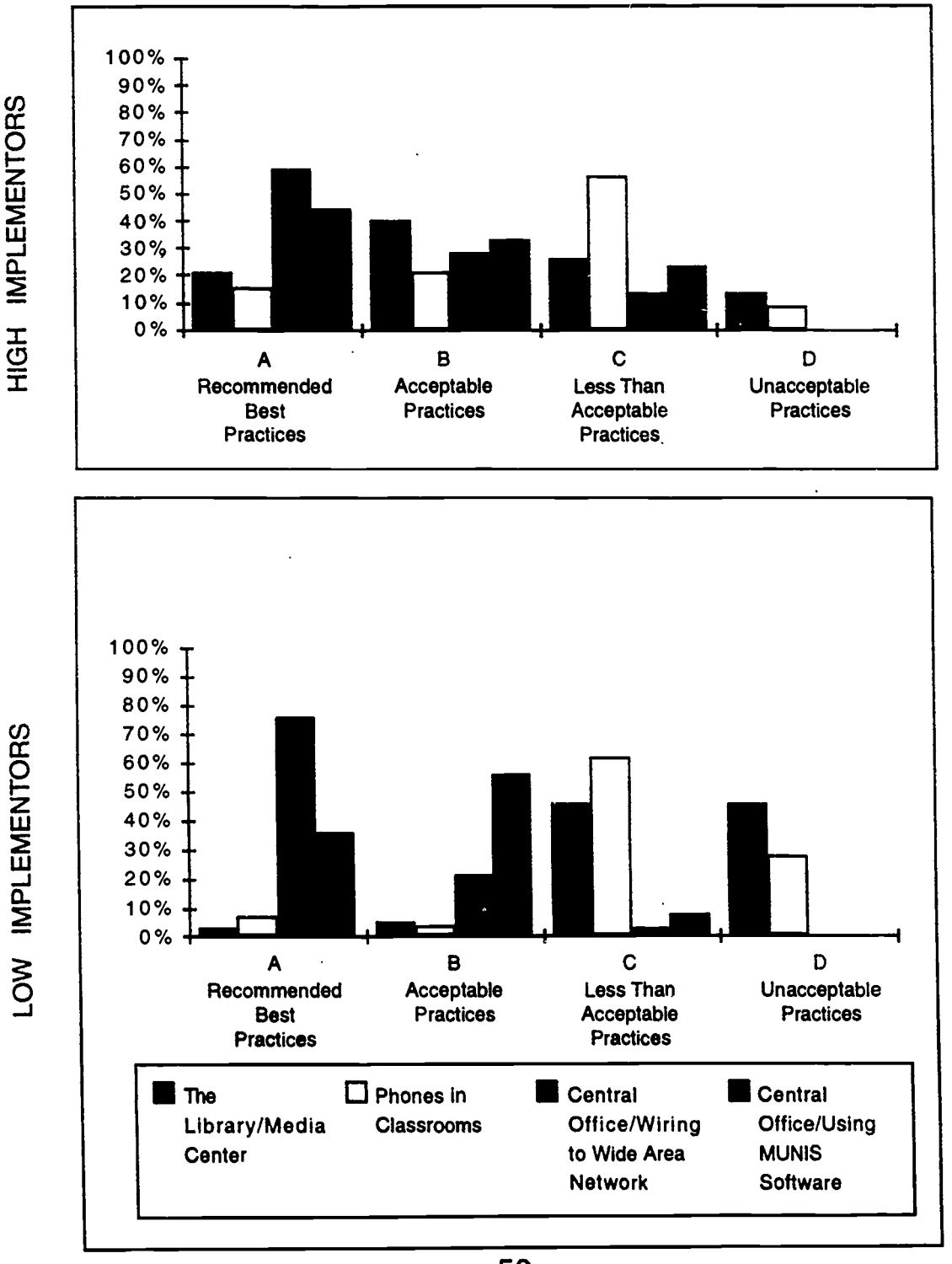

Figure 10
Comparison of High/Low Implementors for Study I: External Evaluation Data
Community Support for KETS

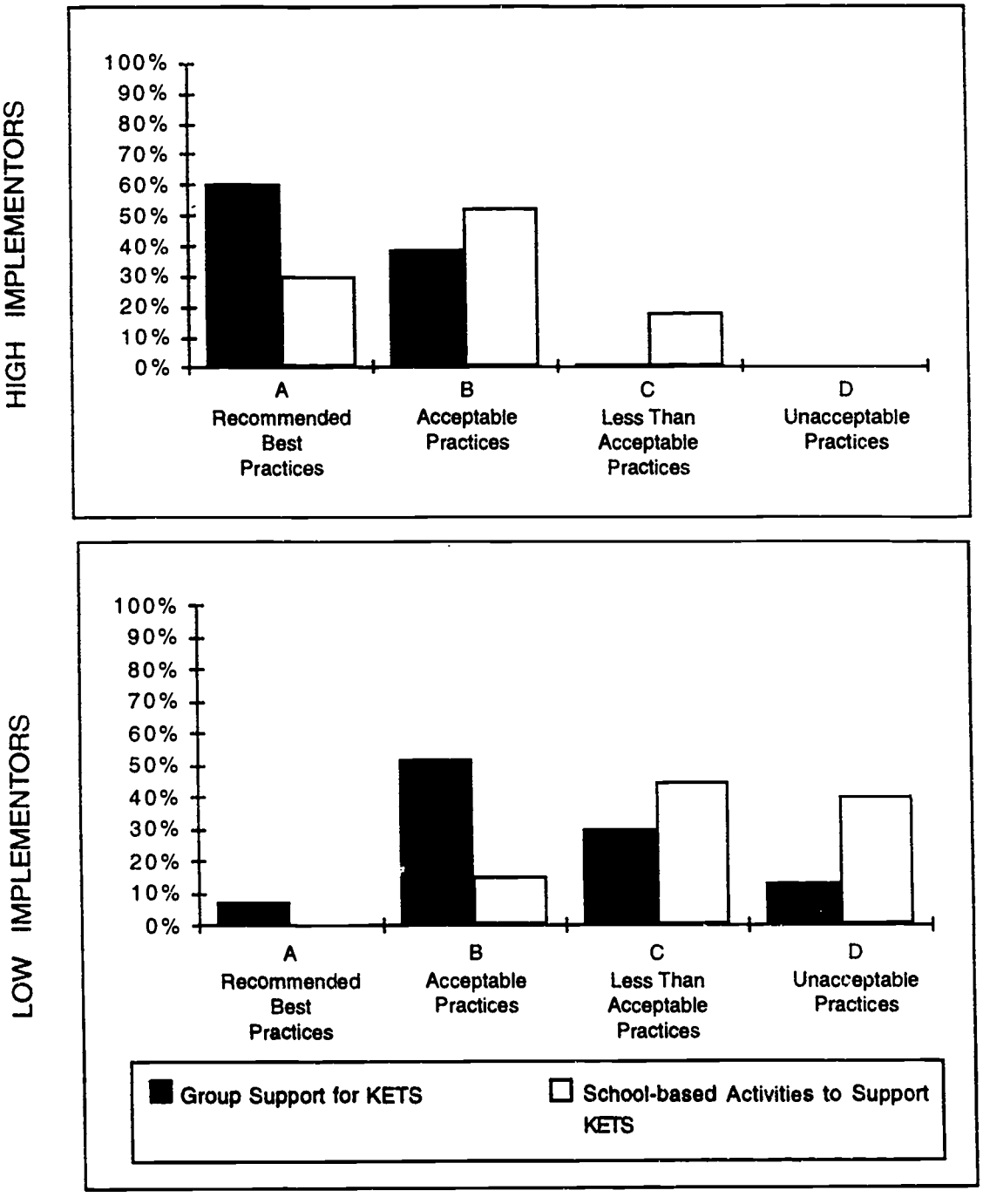

Figure 11
Comparison of High/Low Implementors for Study II: Self-Assessment Data Technology Support for KERA Initiatives Component

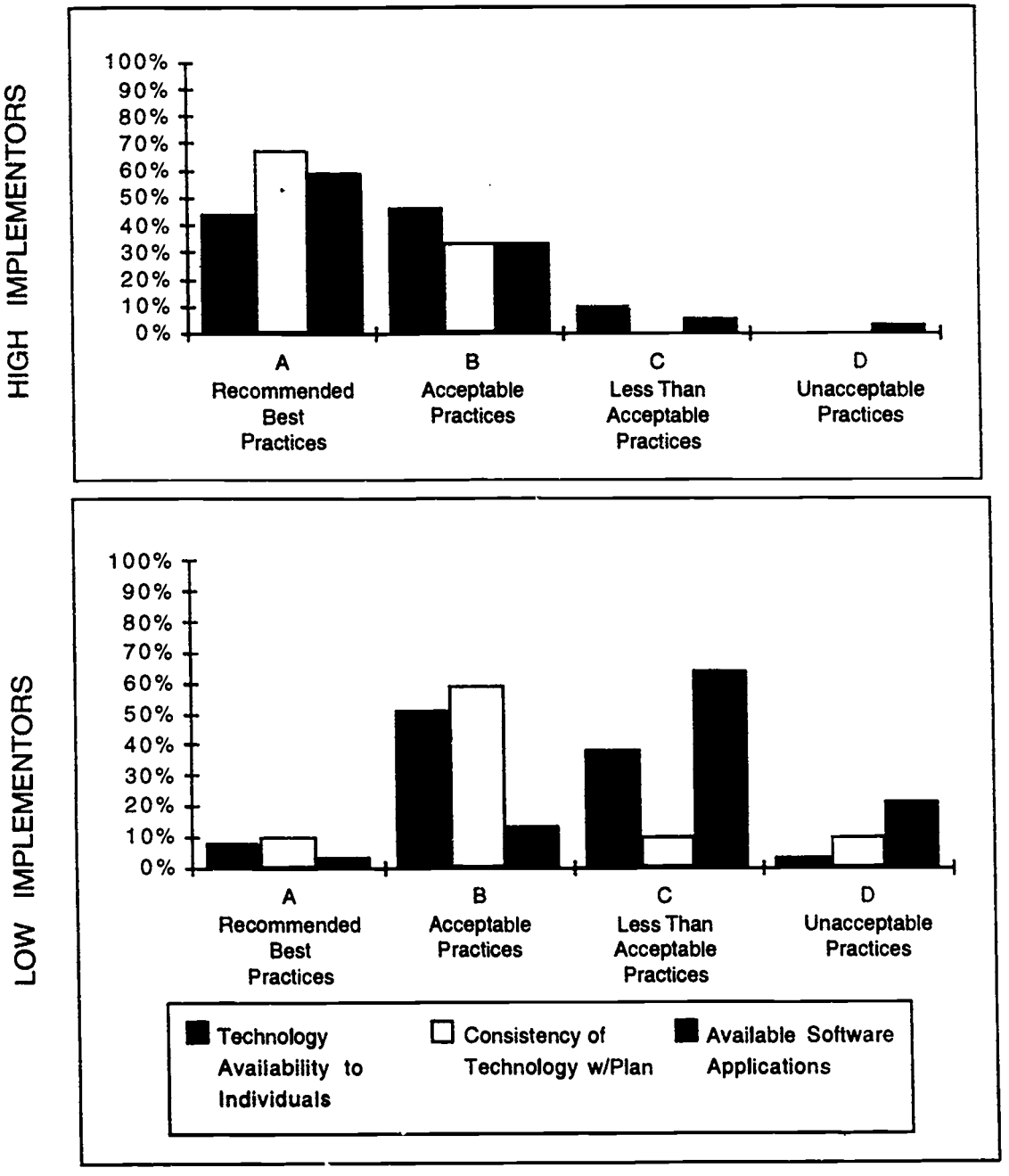

Figure 12
Comparison of High/Low Implementors for Study II: Self-Assessment Data Technology Used in the Instructional Process

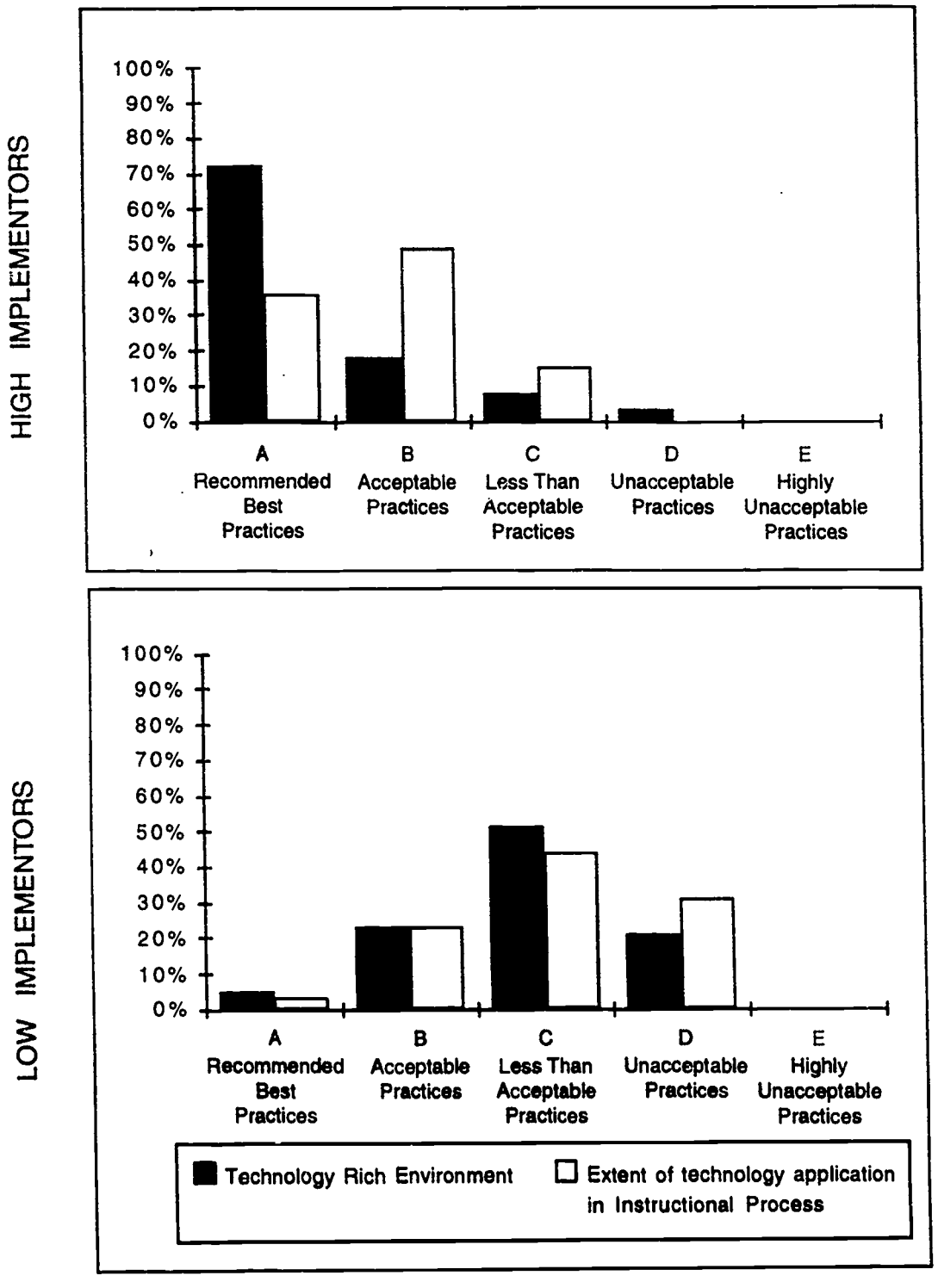

Figure 13
Comparison of High/Low Implementors for Study II: Self-Assessment Data Professional Development of School Staff

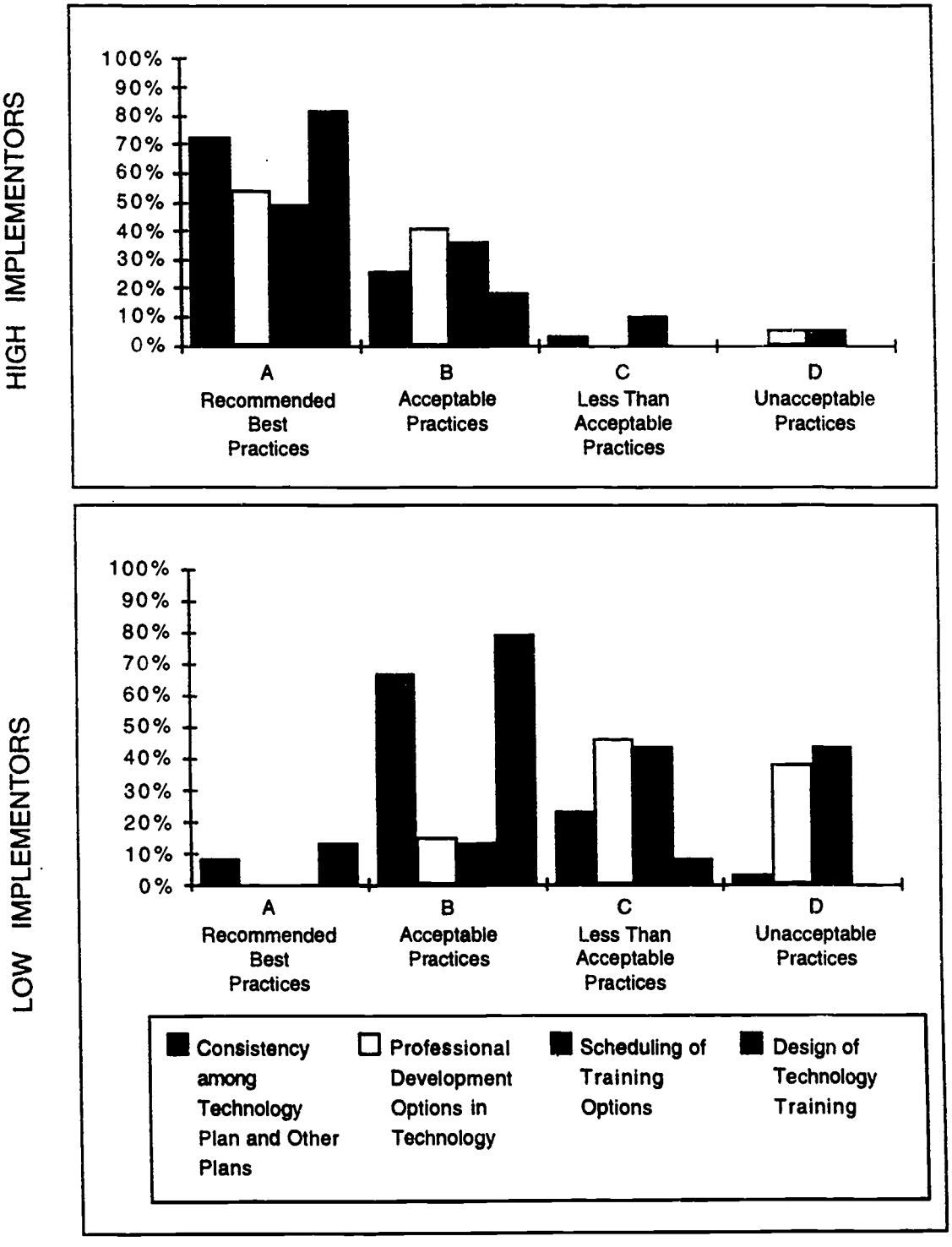

Figure 14
Comparison of High/Low Implementors for Study II: Self-Assessment Data
The School Technology Committee: Function and Process

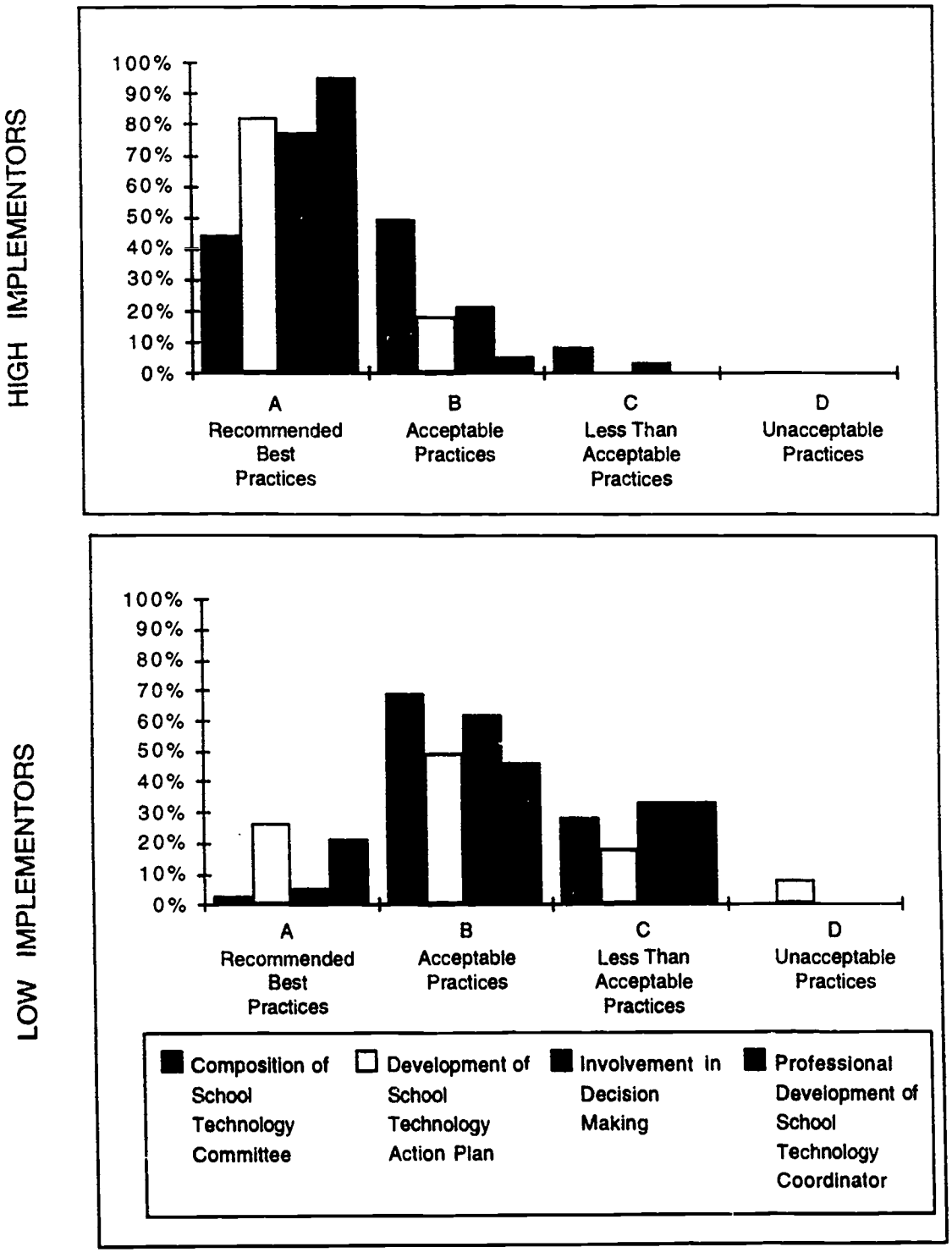

Figure 15
Comparison of High/Low Implementors for Study II: Self-Assessment Data KETS Resources

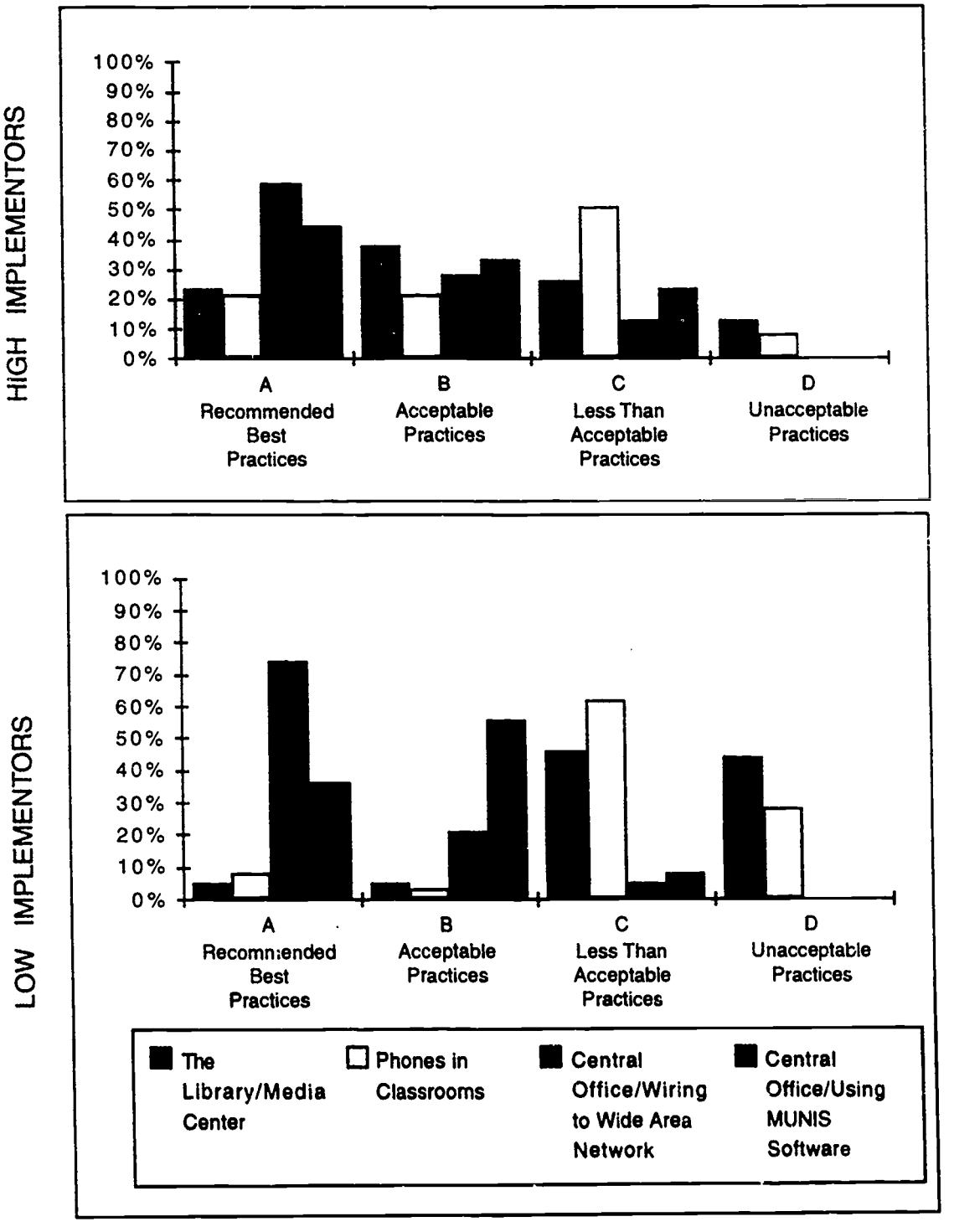
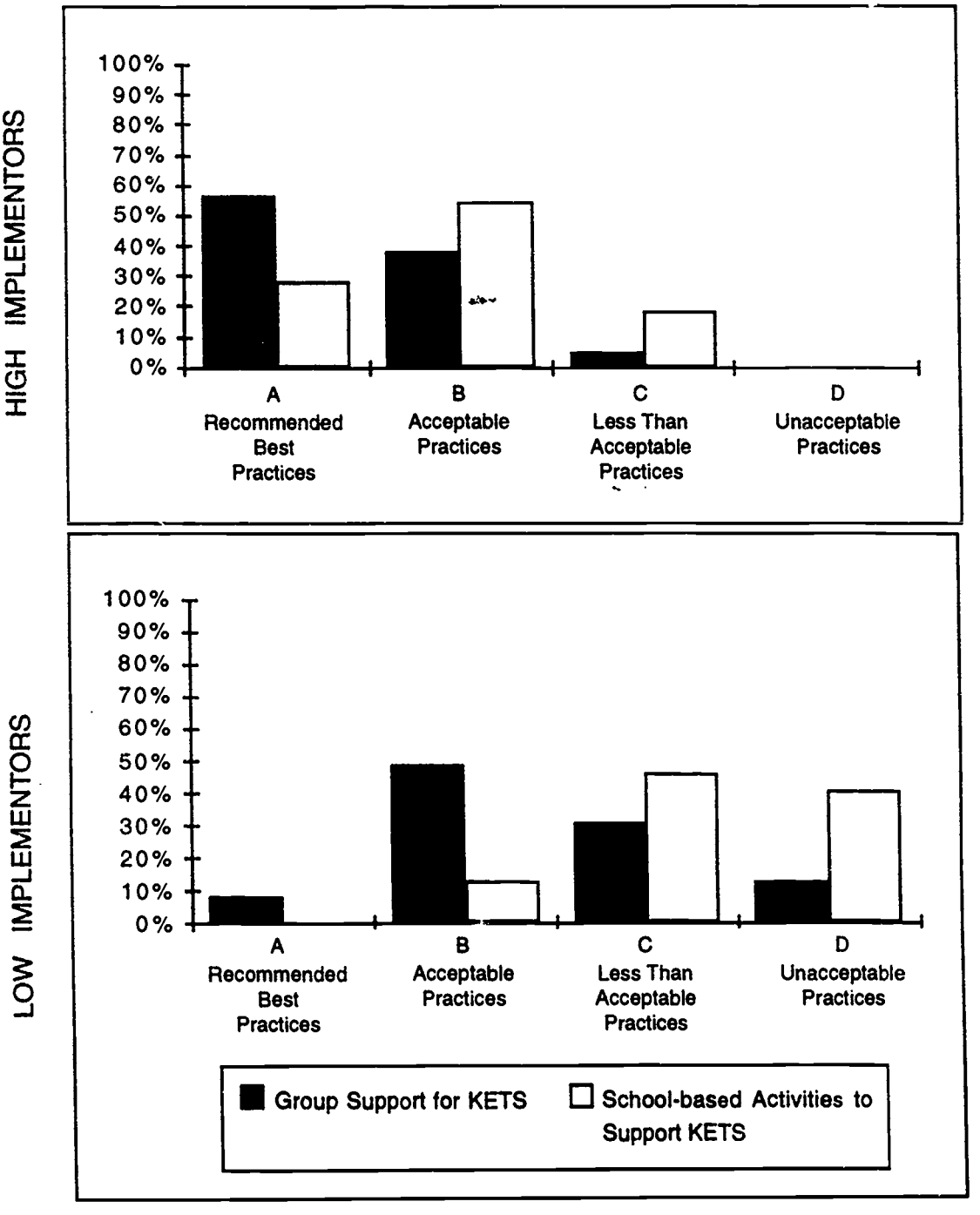
Figure 16
Comparison of High/Low Implementors for
Study II: Self-Assessment Data
Community Support for KETS