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Community college educational technology: Its control, allocation, purchase and utilization in relation to the decision-making process

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COMMUNITY COLLEGE EDUCATIONAL TECHNOLOGY: ITS CONTROL, ALLOCATION, PURCHASE AND UTILIZATION IN RELATION TO THE DECISION-MAKING PROCESS

by

William David Randall

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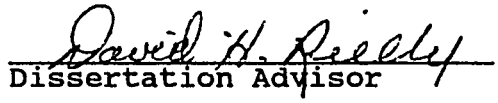

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APPROVAL PAGE

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The purpose of this case study was to investigate the decision making process employed by one community college in the area of educational technology acquisitions. The study was designed to delineate the use of particular decision-making processes and describe how the process related to the needs of the faculty.

A triangulated methodology utilized questionnaires, interviews, and document searches to answer four research questions. Descriptive statistics and analysis of variance were used to analyze survey data.

A well structured bureaucratic process was found to govern the allocations process. This process was communicated by administrators to faculty members through formal and informal means. A formal process utilized documented roles and responsibilities and administrative directives to generate prioritized departmental equipment requests which were used to determine allocations funding. Advisory committees contributed to both vertical information flow and institutional planning. An informal communication process existed to complement the formal process. The informal component enabled administrators and faculty members alike to communicate across disciplinary lines, function quickly in emergencies, and form effective

informational networks. While the institution's allocations process utilized some participatory management procedures, characteristics of bureaucratic and political management models predominated.

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CHAPTER I

INTRODUCTION

We live in the information age, an age of technological achievement, new paradigms, and tremendous change. The impact of technology is most noticeable on institutions of higher education which specialize in technical education. This is evidenced by new curricula, increased expenditures for state-of-the-art equipment, and increased external influences from local industry and business.

The impact of technological innovation is a prominent element in contemporary community colleges. From their technical college origins, community colleges have evolved into comprehensive institutions of higher education. They now offer a wide array of services to adult learners.

Through the open-door policy, adult learners are provided opportunities for educational growth (Tillery & Deegan, 1985). The comprehensive mission of community colleges is subdivided by Cohen and Brawer (1982) into four traditional components: (1) career education; (2) compensatory education; (3) collegiate functions; and (4) general education. Community colleges provide a full spectrum of transfer, diploma, and special programs. At community colleges, sophisticated technical and vocational

The impact of new, significant, and needed educational technologies upon community colleges produces conflict and challenge. In this charged environment, decisions are made regarding applications of technology in instructional settings. These choices are affected by both internal and external forces. Often these forces conflict. It was in this potential arena of conflict that the relationship of the acquisition of educational technology and the decision-making process was addressed by this study.

Decisions within a community college often involve bureaucratic procedures, established lines of communication, and specific interests of individuals and groups. Although an idealistic pattern of decision making can be predicted based on procedures, communication, and interests, a realistic pattern involving crises and politics may emerge as well. This study identified both decision-making patterns. These patterns were compared with theoretical models to identify the theoretical decision-making model used by the community college.

New media and delivery systems are changing the way we teach, learn, and communicate. These technologies are transforming the way we transact the business of education. Colleges regularly utilize facsimile production of letters, computer-generated graphics, electronic mail, computerized interlibrary loan, telecourses via broadcast television, teleconferences via satellite, and multimedia. The future

promises even more utilization of rapidly developing technology. Distance education promises to deliver quality educational opportunities to students miles away from any campus. Currently, home learners can benefit from videocassette recorders, audiotape recorders, videodisc players, home computers, broadcast media, and satellite communications (Hanken & Fey, 1985). The National Technological University offers five Master of Engineering degrees via satellite through a consortium of over 20 major universities.

Donovan (1985) recommended that community colleges should acknowledge and take advantage of the potential computers offer students. Many language and computational tasks can be performed effectively on computers. Routine student questions usually directed to administrators and faculty can now be answered via computer. Once students and faculty become proficient in their use, computers can play an increasingly sophisticated role in basic skills classrooms and laboratories.

Educational technologies are adopted by community colleges because they offer advantages. Evans (1982) listed some of these advantages:

(1) Improved quality of education

(2) Greater quantity of education

(3) Greater flexibility in organization

(4) Enhanced opportunities for independent study

(5) Enhanced opportunities for disabled students

(6) More time for teachers "to teach"

(7) Long distance instructional delivery

(8) Opportunities for continuing education

(9) Satisfaction of public's educational demands

Educational Technology provides opportunities to both traditional students and students with special needs. Remedial students are helped with "talking" computers. Students can acquire computers designed for visual impairments or physical handicaps. Through use of teleconferences, telecourses, and fiber optics, community colleges are overcoming barriers of time and distance. Education Technology is empowering the learner.

This study focused on the decision-making process of one community college as it related to the control, allocation, purchase, and use of educational technology. Information obtained through this case study may assist others in understanding how a particular decision-making process is employed, how it impacts the user of the technology, and why the particular decision-making strategies are thought to be congruent with theoretical models.

Decisions made regarding educational technology involve major expense, planning, commitment, and vision. Although many factors affect the decision-making process, this study dealt primarily with the following questions: (1) who makes

decisions regarding control, allocation, purchase, and use of educational technology? (2) what criteria do they use? and (3) how do those decisions affect the users of educational technology? The relationship between the decision-making process and the user of the technology is the focus of this study.

Statement of the Problem

Community colleges fill several distinctive roles. They provide highly technical and vocational curricula as well as traditional general educational offerings. External pressures to provide state-of-the-art industrial training co-exist with financial pressures of dwindling federal and state resources. Community colleges are expected both to model the latest technology and to teach it.

Introduction of new technologies involve a complex interaction of internal and external factors. These include departmental interest, budgetary constraints, and technical considerations. One concern is the proliferation of technology available to specific areas of instruction. Another is the impact these new technologies have on perceptions of instruction, the role of college personnel, and institutional policy.

Community colleges are expected to provide not only competent understanding of new technologies but also develop courses and curricula to teach competencies in those same

technologies. This is not solely an administrative problem. Faculty too must develop their own personal competencies in new technologies. Class management is improved through use of computers. Many texts come with software which must be integrated into the course. Many students demonstrate mastery of computer skills, thus forcing their instructors to become computer-literate. Faculty members find themselves in need of skills with computer networking, interactive TV, and multimedia.

Confounding these developments, budget cuts resulting from loss of federal and state revenues have depleted equipment budgets. At a time when community colleges need more resources to implement technological innovation, the reality is less money available for existing programs. As the need for more educational technology has risen, the resources to pay for them has decreased. Accountability has surfaced in education as a watchword for administrators as they attempt to balance budgets and continue to maintain the various missions of their schools.

The relationship between the decision-making process and faculty needs and use of educational technology deserves investigation. Although many studies focus on decision making and many others focus on educational technology, the relationship between the two has not been addressed. This is an area that can be addressed through self-study. The major questions then are (1) who makes the decision, (2)

what criteria are utilized in the process, and (3) how do those decisions affect the users of the technology.

The Purpose of the Study

The purpose of this study was to investigate the decision-making process at a community college as it relates to control, allocation, purchase, and utilization of educational technology.

The Conceptual Base

The focus of this study involved the utilization of technology at a point juxtaposed between the administrative decision-making process and user utilization. There are both an ideal and a real relationship between the decision-making process and the user of technology. These relationships both have a bureaucratic format through which (1) the faculty member or user of technology makes requests for new equipment, and (2) an administrative decision is made regarding that request. Both relationships are based on needs, budget considerations, objectives, and goals. However, while the ideal model relies purely on bureaucratic structure, the reality relationship includes political and financial pressures.

Two schematics or process loops, representing these relationships, are possible. The idealistic loop begins with a needs assessment by an originating party. It is then

implemented by administrators contingent upon financial resources and priorities. A realistic loop deals with more complicated factors such as interdepartmental competition, external forces, hidden agendas, politics, and individual conflicts.

The decision-making process uncovered through this study will be compared with three theoretical decision-making models: (1) bureaucratic, (2) collegial, and (3) political (Cellucci, 1989). Characteristics identified in the observed process will be charted to determine which theoretical model fits the community college decision-making process.

Research Questions

In order to address the purpose of this study the following questions will be examined.

(1) What is the relationship between the decision making process and the user of educational technology?

(2) How do decision makers select educational technology at a community college?

(3) What are the procedures for governing control, allocation, and purchase of educational technology at a community college?

(4) What educational technology do faculty use at a community college?

Importance and Significance of the Study

Technological innovations are producing widespread changes in our society. These changes are occurring at an accelerating rate as past and current innovations spawn future technologies. A major problem, and a purpose of this study, involves monitoring events that reflect these changes. Toffler (1974) suggests that we must not only monitor change through a series of past-oriented indicators; we must also develop acceleration indicators to develop a new view of time and the future. Two acceleration indicators affecting community colleges relate to (1) the level of skills needed for the 21st-century workers and community college graduates; and (2) the evolutionary impact of computers on our society (Nickerson, 1988).

Current trends in educational technology point to three major areas that will affect community colleges and the adult learners of the future (Percival & Ellington, 1984). The first of these is a shift toward a more student-centered approach to learning. The second area emphasizes non cognitive skills and attitudes in learning, the ever-widening realization that there is more to education than teaching basic facts and principles. Finally, the explosive increase in the use of new information technology in practically all aspects of education and training is the third area.

The explosive increase in computerized information systems may eventually mean a radical rethinking of virtually all of our present educational practices. Computers in society require us to rebuild education in the presence of the computer (Sendov, 1986). Sendov has redefined the computer as a metaphor in pedagogical theory. They admonish educators to monitor the usage and adoption of educational technology in our schools, and be aware of emerging trends and patterns of educational technology in society and education.

In an arena of technological and social change the community college's mission to provide technical training and leadership becomes increasingly more important and more difficult. This study provides a means to monitor utilization of educational technology in a community college. It also will determine how decisions are made regarding acquisition and implementation of educational technology and who makes them. Further, this study seeks to identify characteristics of management styles to determine what overall management model is exhibited by the community college. With data collected from this study, predictions of future utilization and needs of educational technology can be made. Also, the process of decision making can be described as steps or tasks undertaken by individuals with specific roles and responsibilities. These tasks can be identified and monitored with the resulting information

adding a further dimension in determining the effectiveness of the community college's educational technology program.

Information obtained through this case study will assist others in understanding how a particular decision-making process takes place and why particular decision-making strategies are utilized. The study will demonstrate the process of selecting and applying educational technology by (1) tracking the decision-making process; (2) surveying decision makers to determine factors contributing to the decision-making process; and (3) assessing the needs of the users. Qualitative research methods will be employed in order to detail the parameters of the college decision-making process.

Definition of Educational Technology

Educational technology was defined as any electronic device which helps students, faculty, and staff learn, teach, store information, generate information, communicate, and manage resources. Educational technology includes (1) projected media such as slides, filmstrips, and movies; (2) audio recordings on records, tape, or laser disk; (3) television including instructional, broadcast, satellite, closed circuit, recorded, computer generated, and interactive formats; (4) computers; and (5) any combination of the above.

Summary

Innovations in science and technology are changing our society. The impact of technological change is felt strongly at higher education institutions that offer technical courses. Community colleges must respond to changing demands from adult learners, local business and industry, and accrediting bodies. Increasing needs for educational technology conflict with decreasing financial resources to pay for them as federal and state funding to community colleges is reduced. The decision-making process employed by community colleges represents the arena where increasing needs collide with decreasing funding. Educational technology is an evolving field of study. Innovative technology is proliferating in all aspects of adult education. These innovations offer educational opportunities that transcend distance, physical handicaps, and constraints of the traditional classroom. This case study will address questions regarding the relationship between the decision-making process and the utilization of educational technology by faculty members.

This study is organized into five chapters. Following this introduction, Chapter II will review relevant literature. Chapter III will describe the methodology used to collect and analyse data. Chapter IV describes the results of the study. Finally, Chapter V discusses the

results, their implications, and makes recommendations for further study.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter provides a review of the literature relevant to the current study. It is divided into four sections. Section one addresses technological innovation and the pronounced effect it has made on our society and culture. Section two discusses educational technology and describes it as an emerging educational discipline. The third section relates educational technology to the community college in a changing society. The fourth section focuses on decision-making. A short summary is included.

Technological Innovation

Change in our society has been so rapid that Alvin Toffler used the term "future shock" to define the "dizzying disorientation brought on by the premature arrival of the future" (Toffler, 1970, p. 11). Toffler explained in his book Future Shock that society is experiencing culture shock from within due to an accelerated rate of change. The acceleration of technological development has brought about an end to the perceived permanence of many of society's institutions. Man-made technological development has far-reaching impact. Toffler stated: "Change is the only predictable factor in our culture" (Toffler, 1974, p. 7). We

are witness to an evolution not of biological change, he warned, but mechanical-scientific change.

Technological innovation consists of three stages: (1) the creation of a feasible idea; (2) a practical application; and (3) the diffusion through society of that application. Historically, this process took hundreds of years. But by linking these three stages into a self-reinforcing cycle the process accelerates and is compounded by simultaneous development of complementary technology. Thus the concept that "technology makes more technology" becomes a reality (Toffler, 1970, p. 26).

Transformations.

In his book Megatrends, Naisbitt (1982) discussed the evolution of our society as it attempts to restructure itself in the turbulence of technological and social change. He described several major changes affecting our society. The first is a transformation from an industrial society to a information society. By combining satellite communications, computers, and fiber optics into a self-reinforcing cycle of innovation, our society has become information oriented.

The implications of this transformation are enormous. Marshall McLuhan described two transformations in our culture with his phrases; "the medium is the message" and "the global village" (McLuhan & Fiore, 1967). The

implications are (1) that technology presents new avenues of communication and thinking and (2) that personal communications are now global. Learning technologies have greatly increased the opportunities for self-study. Future education and industrial training will be greatly enhanced by computers and interactive learning machines (Fledman, 1985).

Jobs in this century alone have evolved from farming to manufacturing labor, to clerical positions. Knowledge and information have economic value and now must be considered a resource. An example is Japan which has few natural resources but a dedicated knowledgeable workforce (Ouchi, 1981).

A second transformation is a result of the human growth movement, a humanistic compensation for overexposure to "unfriendly", unaesthetic, machine-oriented technology. Naisbitt described the trend to humanize technology the high-touch movement. "The technology of the computer allows us to have a distinct and individually tailored arrangement with each of thousands of employees" (Naisbitt, 1982, p. 43). This individual approach applies to pension arrangements, a variety of compensations, flexible work times, contract work arrangments, and work at home. High touch enables instant communications among a large number of people. Distance is not a great obstacle.

A third transformation is the trend toward a world economy and from short-term thinking to long-term vision. Many top corporations have changed their management styles to accommodate long-term relationships, not only with suppliers and customers but employees. Emphasis on long-term growth with careful balance between technical and humanistic factors results in high productivity. Quality products and fierce loyalty among employees have resulted from management procedures that focus on empowerment of the labor force (Ouchi, 1981).

Large corporations have discovered decentralization as a method of building teams to solve highly technical problems (Peters & Austin, 1984). A transformation is under way toward independence and away from centralized control. Emerging self-reliance is evident in formal and informal informational networks which are replacing dependence on centralized authority which was formerly the distributor of information. These transformations have been made possible in part because "now we mass-produce information the way we used to mass-produce cars" (Naisbitt, 1982, p. 16).

Utilization of computers is allowing freedom from mundane repetitive jobs. Computers have opened up a vast array of opportunities for small business. We have moved from a national economy to a world economy. The only constant in our times in change. "For what is occurring now

is, in all likelihood, bigger, deeper, and more important than the industrial revolution" (Toffler, 1970, p. 12).

Individuals have discovered the need to network both formally and informally with their peers and organizations. Naisbitt (1982) described networks as existing "to foster selp-help, to exchange information, to change society, to improve productivity and work life, and to share resources. Emphasis is on the communication that creates the linkages between people and clusters of people" (Naisbitt, 1982, p. 192). The concept of a community of individuals linked by common interest and the utility of computerized communications is a reality. Hefzallah (1990) described new goals for an educated person of the next century, which reflect utilization and knowledge of computers and automation as well as a basic understanding of global ecology, resources, and committment to future generations.

Technology.

In his comprehensive treatise, The Evolution of American Educational Technology, Paul Saettler defined technology as "any systematized practical knowledge, based on experimentation and/or scientific theory, which is embodied in productive skills, organization, or machinery" (Saettler, 1990, p. 4). Instructional technology was defined in operational terms as "[t]he media born of the communication revolution which can be used for instructional

purposes alongside the teacher, textbook, and blackboard" (Commission on Instructional Technology, 1970, p. 21). Larry Cuban defined educational technology as "any device available to teachers for use in instructing students in a more efficient and stimulating manner than the sole use of the teacher's voice" (Cuban, 1986, p. 4).

Electronic hardware and computer software enable people to extend their senses, expand their memories, and communicate rapidly over distance. Analogue technology brought about television, radio, telephone, and world-wide communications. The expense of these systems resulted in centralization of control and utilization. Computerization and high memory utilization represent a shift from analogue-dominated technology to digital technology (Hefzallah, 1990). Increasing digitalization of mass media and telecommunications is a critical aspect of the information society. Through digitalization, communication among humans and machines is as easy as personal conversation (Saettler, 1990). Digitalization provides a means of informational management and a means of processing and exchanging data among multiple and diverse sources. This medium also allows decentralization and networking at the discretion of the individual (Hefzallah, 1990).

An example exists with multimedia and an authoring and control computer. Multimedia typically include the media of text, images, audio and video with built-in support from a

centralized authoring environment (Drapeau, 1992). Drapeau redefined media as the applications written for sources of information. Digital information from diverse data sources can be controlled by a central digital device. The data sources may be CD-ROM, television, graphics, audio, and data or word processing. Practically any existing media can be utilized through this method. The digital manipulation of various media sources represents a new medium. Digitalization therefore is a decentralizing technology. It allows an individual to operate autonomously or to network among a group or groups.

A listing of media technologies available today would include several broad categories. Television and related technology include (1) broadcast, cablecast, and satellite TV; (2) studio, edited, computer-generated, and home video; (3) projected television; and (4) teleconferencing. Projected media include (1) transparencies and overhead computer projections; (2) slides, filmstrips, and movies, (3) opaque projection; and (4) laser projections, either self-contained or computer-controlled. Audio/sound media include (1) records, (2) compact disks (CDs), and (3) magnetic tape of various formats. Many audio/sound media are included in other media such as videotape, movie soundtracks, and laser disks. Computers store data via digital storage formats: (1) floppy disks, (2) hard disk cassettes, (3) tape cassettes, and (4) hard drives. Data

can be stored in large networks, hard drive units on individual computers, and back-up disks or tapes. Optical scanners can convert hard copy to digital data that can be subsequently stored on digital formats.

Innovative combinations of these media result in ever increasing numbers of new media. Simulators utilize computer software and video to provide realistic training situations. Virtual reality is a concept resulting from inclusion into a computer-generated world, or reality as viewed through TV head gear. All incoming stimulus, visual and auditory, is provided by the computer.

Percival and Ellington (1984) described two phases in the evolution of technology with instructional applications: hardware and software. The hardware phase is characterized by the development and adoption of servicable, reliable, and cost-effective equipment. The software phase focuses on specific consumer needs, perceptions, and utility.

Educational Technology: An Emerging Discipline

Educational technology is a process which emerged when knowledge began to be systematically applied to instruction. The use of certain products or media has always been secondary to the technology of education. Saettler (1990) wrote that educational technology has been developing from

ancient times through a trial-and-error process involving long practice, creativity, and persuasion. The Commission on Instructional Technology (1970) defined instructional technology as a way of designing, implementing and evaluating the total process of learning within a framework of objectives. This systematic definition is based on research in human learning and communication theory and employs a combination of human and nonhuman resources to bring about more effective instruction.

The meaning of educational technology has evolved in relation to philosophical, psychological, scientific, and historical conceptions and orientations (Saettler, 1990). This hermeneutic approach (Messer, 1988) seeks to find a contextual understanding of specific cases against a backdrop of historical and cultural influences. An overview of the evolving and emerging meaning of educational technology from a systematic instructional perspective is presented in the next three sections. The first section describes philosophical and psychological contributions by several prominent innovators of systematic instruction. The second section deals with technical innovations and systems that have impacted on instruction. The third will deal with established paradigms of educational conceptualization.

Philosophical and Psychological Orientation.

Origins of methodical and empirical observation applied to instruction date back to the 1600s with Johann Amox Comenius, who not only designed one of the first visual aid picture books for children, but also advocated a scientific and systematic approach to instuction (Brubacher, 1966).

Johann H. Pestalozzi developed a concept of learning sequence which broke down content into its simplest elements and then developed exercises based on the study of objects rather than words. Objects were utilized to illustrate mathematical concepts and physical phenomena (Brubacher, 1966). Pestalozzi's influence was instrumental in the rise of German education in the early 1800s. Froebel's kindergarten concept incorporated Pestalozzian object-teaching methodology.

Johann Friedrick Herbart developed the first systematic psychology of learning. To Herbart, learning was a process of assimilating new and old ideas (Rippa, 1984). His work had a great impact upon American education, and his emphasis on psychology was reflected in the work of Edward Thorndike.

Thorndike worked with major physchological concepts of his time to develop laws of learning that provided the basic principles underpinning his technology of instruction (Rippa, 1984). His laws were based on the stimulus-response

hypothesis that predicted patterns of behavior based on a succession of environmentally structured responses. Thorndike formulated activities that rewarded desirable behavior and created discomfort for undesirable behaviors. He termed these response behaviors "connections" and demonstrated empirical-inductive methods to test the legitimacy of his laws. "Thorndike was the first modern instructional technologist" (Saetler, 1990).

John Dewey (1933) argued against the "connectionistic" theory of Thordnike in favor of a new psychology of learning. Dewey explained that learners make meaning, take action, and base their goals out of experiences with their environments (Saetler, 1990). Dewey championed the Progressive Education movement which designed a new curriculum centered on the individual. While the Progessive Education movement failed, Dewey's contribution to instruction was to establish the scientific method as a means of both learning and teaching (Brubacher, 1966).

Maria Montessori was an advocate of individualized self-paced instruction. Instructional materials developed by Montessori were self-corrective, so that learners could discover their own mistakes and become progressively more independent (Saetler, 1990). This instructional approach using didactic materials was found to be of value in augmenting environments for all learners. When supplemented with experimental research, Montessori's instructional

approach provided a basis for scientific technology of instruction (Saetler, 1990).

Continuing to expand the scientific method in instruction design, Henry Clinton Morrison developed an individualized instruction method whereby the classroom was a laboratory. This laboratory concept encouraged development of such theories as the cognitive-field theory of learning by Lewin, who approached learning as a problem solving activity. He believed that learners seek perceptions and memories which they incorporate into understandings of a newly reorganized life space (Hergenhahn, 1976). An instructional technology built around this theory provides for analysis of the entire instuctional environment (Saettler, 1990).

B. F. Skinner's psychology of operant conditioning or behaviorism, explained behavior in mechanistic terms. Skinner, like Thorndike before him, aspired to predict and control human behavior through scientific study of conditioned response.

Jean Piaget's contribution to educational technology was his formulation of models of cognition. Piaget's system utilizes psychometrics rooted to cognitive-field theory. Unlike behavioral systems the cognitive-field theory involves the link-up of single operations with other operations to consititute whole structures. It is the concept of the whole structure that enables the Piaget

system to function in complicated instructional situations (Saettler, 1990).

A comprehensive classification of educational objectives was developed by Benjamin Bloom (1956) whose taxonomy has fallen under criticism (Pring, 1971; Duncan, 1972; MacDonald-Ross, 1973). Wagner (1982) argued that Bloom's theory does little to provide guidance in the use of media.

Task analysis is applicable to use of media (Wagner, 1982). Task analysis provides a useful taxonomy of learning tasks in a heirarchal and cumulative fashion (Gagne, 1965) based on mastery of one step before proceeding to the next. This process enables content to be specified in terms of particular learning tasks required of students and is applicable to a multitude of instructional processes using media (Wagner, 1982).

This survey highlighted the development of technologies of instruction. It was, and continues to be, an evolving process. A scientific basis for developing and evaluating instructional programs and processes is the cornerstone of the systematic approach to educational technology.

Technical Innovations and Systems.

Equally important to the systematic instruction orientation is the availability of media to transmit the spoken, written, or digital word among teachers and

students. The impact of technological change is evident by the accelerated rate in invention and innovation in the last decades. By utilizing media in systematic instruction methods, new methods of instruction have been developed to individualize instruction. Computers have made contributions to a theory of teaching, curriculum development, and interactive learning (Hefzallah, 1990).

Visual education and visual instruction were two terms that expressed an educational movement in American education from the early 1900s to World War II (Saettler, 1990). The technology that supported this movement produced photography, the stereoscope, slide projection, and the motion picture projector. A prevailing problem with the movement was a lack of uniform practices in the administration of visual instruction (Judd, 1923). At the national level, visual instruction organizations began to merge to consolidate their influence and reduce parallel structures and the NEA's Department of Visual Instruction was established in 1932 (Saettler, 1990). Progressive educators supported this movement as did entrepeneurs who had a financial interest in the new visual media which included stereographs, lantern slides, maps, models, slidefilms, and motion picture films. Both groups envisioned an expansion of instructional delivery through these media. The development of visual instruction progressed from small collections of slides and stereographs to large municipal

and state visual media collections and museums. Educators in general were slow to adopt new techniques of communication as they became available. The conservative nature of education produced lagtimes of decades between availability of media and the inclusion of such technologies in general use and teacher education (McClusky, 1924). While Montessori developed programmed instructional devices and Pressey developed automatic testing machines (Hefzallah, 1990), decades passed before wide spread programmed instruction was included in curricula (Saettler, 1990).

The visual education movement declined as new media were developed and adapted to instructional purposes. The terminology of visual or audiovisual materials was preempted by instructional media. As the visual instruction movement converged with the mainstream of educational technology emphasis was placed on providing rich, concrete experiences for students.

World War II marked a transition from visual instruction to integrated media instruction programs. While the visual movement generally ignored psychological theory to develop group presentation materials, the war years saw much experimentation, research, and study in instructional media development. The work of Skinner (1954) on the technology of teaching did much to promote a behavioristic approach to educational technology.

The United States Office of Education established the Division of Visual Aids for War Training in January of 1941. Movies were selected as the medium of choice for training purposes (Brooker, 1946). A visual aids instructional unit contained accompanying filmstrips and written materials. The films would convey information, principles, and attitudes in terms of the performance of specific jobs (Saettler, 1990). Films, organized around visual content, were of various length depending on the complexity of the content. The films were shot from the operator's perspective and commentary was first-person (Brooker, 1946).

Professional film-makers and instructors collaborated on training films which observed accepted educational philosophy and psychology. This was a pioneering, experimental program. Visual aids were developed as units, which were integrated into series to promote learning of physical skills (Saettler, 1990). Few of the targeted programs had benefited from such training materials before. All of these programs involved adult education in some specific skill activity.

Military training was a massive undertaking. Training films were found to accelerate training time with no loss in effectiveness. Films made the class work more interesting and resulted in less absenteeism. Films made at the university level were often effective at lower operating levels as well (Brooker, 1946).

Two dominant forces molding the character of military training programs were the instructional expertise of civilian educators and the artistry of professional film makers. Educators who have been conducting experimental research on instructional media had developed a technology of instruction. The professional cinematographers added techniques to make the films both emotionally possessive and intellectually stimulating. "Army films penetrated deeper into the recesses of the human mind than do school films which coldly present a series of related facts without relating these facts to the backgrounds, interest, motives, and actions of the people to whom they are shown" (Hoban, 1946, p. 21). The military training films of the 1940s demonstrated an empirical understanding of human behavior and a positive approach to motivation.

Instructional materials developed and utilized by armed services training programs included (1) projected media, (2) graphics, (3) audio, (4) three-dimensional aids, and (5) written materials. Simulation of complicated mechanical devices was devised to provide realistic situations so that trainees could practice dangerous procedures. Thousands of films were catalogued by the armed forces. Instructors too received training through film. Films used for instructor training emphasised teaching methods rather than content. While some films were technically complex and artfully done, others involved simple animation (Saettler, 1990).

Military necessity helped delineated the technology of learning that solved the massive training problems of World War II. This resulted in development of the systems approach to teaching and learning (Knirk & Gustafson, 1986). Complicated problems associated with manufacturing and strategic planning require handling large amounts of information.

Instructional technology utilizes hardware, learning theory, and stresses structured learning environments for solving instructional problems. The processes developed in the behavioral, social, and physical sciences adapted by instructional technologists describe models or flow charts. These process elements serve as guidelines or prescriptions to increase the probability of achieving desired outcomes of instruction (Knirk & Gustafson, 1986).

Diffusion of Innovation.

Knirk and Gustafson (1986) described an instructional technologist is a change agent. As such, the technologist influences what new products or systems are or will be adopted by an organization. Analysis and assessment are necessary to form judgements that will affect the future of educational programs. However, if innovative programs are not adopted, analysis, design, and production effort may be wasted (Knirk & Gustafson ,1986). Gene Moore (1989) mentioned several existing models that describe appropriate

steps to provide effective solutions to educational problems.

In contrast to the problem solving models, Knirk and Gustafson (1986) offer a model based on emerging technologies. Their four step process involves (1) awareness of new materials or process, (2) interest in how new technology works, (3) appraisal of advantages and disadvantages of the innovation; and (4) adoption and integration of new technology.

Models have differed as to their orientations. Mann & Neff (1961) depict an orientation from the organization's perspective, comparing its effectiveness before and after adoption of new technology. The following steps in their model reflect this organizational emphasis: (1) identify situations where there is a instructional problem; (2) identify the characteristics of an organization that make it likely to adopt an innovation; (3) recognize the impact of individual and organizational attitudes on the adoption of an innovation; (4) recogonize the stages normally occurring in individuals and organizations as they progress from awareness to the adoption of an innovative process or materials.

Smelser (1959) dealt with the innovative process from a perspective of disruption in an organization. The process of how people handle disturbances provides an opportunity for change. The symptoms of dissatisfaction that arise due

to disturbances and how both symptoms and disturbances are handled and channeled to identify the need for a change are all a part of the evaluation process and awareness of need (Smelser, 1959).

Moore mentioned a four-step procedure, first offered by Arthur Levine (1980), that provides a guideline to the diffusion process. According to Levine (1980) all innovation processes are composed of four steps or stages. While individual processes have apparent differences, Levine has determined that these are differences in terminology. The first stage, commonly refers to a recognition of need for a change or recognition of a condition. An organizational dissatisfaction, an awareness of a new technology, or a baseline condition are some recognition situations. The second stage involve a planning element to satisfy the need or solve the problem. The third step Levine terms the "initiation and implementation" phase. This stage implements the planning strategies into the organizational opperations. Finally, the fourth stage involves integration or termination of the innovation. Levine believes that regardless of the number of stages reported by differing innovative models, all four of these fundamental steps are necessary and present in all of them. A similar model proposed by Hage and Aiken (1970) identifies four steps as: (1) evaluation, (2) initiation, (3) implementation, and (4) routinization.

Perceptions of Educational Technology.

Lewis Perelman discussed the systems approach to transforming education, arguing that the "essence of this approach is the recognition that technological change and social change are interdependent and inseparable" (Perelman, 1987, p. 31). Developed by Eric Trist this integration of social and technical innovation achieves more effective results than simply adding technology to a rigid social system (Emery & Trist, 1972). The sociotechnical process, an effective management tool internationally, is finally being implemented in the United States. Many American firms are radically changing their organization and managment processes to treat workers-plus-technology as an integrated sociotechnical system ("Management Discovers", 1986).

The sociotechnical systems process is more than a methodology; it represents a new way of thinking about the problems of organizational performance, change, and innovation. Perelman (1987) envisioned a "technology of education rather than technology in education."

Paradigms.

The paradigm of traditional, industrial-age instuction, is the "agogic" paradigm. Agogic has the same Greek origin as the term pedagogy "to lead." As a new way of thinking regarding educational technology, Perelman (1987), suggested that a modern paradigm based on the sociotechnical systems

process could be termed heuristic, from the Greek "to discover".

The agogic paradigm suggests a transitive and aggressive action from one person to another. This model acknowledges an expert or enlightened teacher whose role is to lead the ignorant student to scholastic achievement. The heuristic paradigm, by contrast, is an assertive, independent act performed by an individual person, or shared among a group of peers (Perelman, 1987). Within this paradigm, individual learning takes place with the instructor as facilitator. Paradigms revolutionize not only how instruction takes place but how professionals in the field view their profession.

From a historical perspective, four distinct paradigms have emerged in educational technology: (1) the physical science or media view; (2) the communications and systems concept; (3) the behavioral science-based perspective; and (4) the cognitive science perspective (Saettler, 1990). While the cognitive science perspective is the current dominant paradigm, all of these paradigms exist in the minds of educational professionals.

The cognitive approach emphasizes knowing rather than responding and focuses on mental events. The learner is viewed as an active participant in the instructional process. "The cognitive theorist believes that any complete theory of human cognition must include an analysis of the

plans or strategies that the learner uses for thinking, remembering, and understanding and using language" (Saettler, 1990, p. 479).

Education in the Information Age.

The term "telematic" represents the information technology that is evolving from the marriage of telecommunications and automatic computation. This term suggests a larger meaning for state-of-the-art instructional technology that implies computer interaction with other media. "The rate and scope of advance of telematic technology is unprecendented. Simultaneously, the relatively young discipline of cognitive science is rapidly expanding knowledge of the nature of intelligence and learning" (Perelman, 1987, p. 9). Perelman's implication is that there is a symbiotic relationship between human learning and computer engineering and proliferation. Computers help humans learn more, faster, better, and cheaper while humans promote artificial intelligence in computers.

The emerging reformist goal for American education is concerned with productivity. Development and application of technology for teaching and learning is growing in industry, the military, in the private sector of education and training, and in the home. The public schools, however, are

one sector that can prevent the application of advanced learning systems (Perelman, 1987).

The computer made its entry into education the same way other instructional media did. It soon proved extremely versitile as it aided instruction with multiple activities: more interesting and attractive lessons, computation in mathematics, classroom management, and implementation of programmed education. This computer innovation and adoption was termed the "first wave" of computer utilization in education (Sendov, 1986). This phenomenon was the first automation in the process of teaching as computers improved teachers' productivity. Another manifestation was the study of computers as a new discipline. As computers became more widespread, a demand soon arose for investigate the programming and architecture of computers.

The second wave of computers in education occurred due to the dramatic impact of computers not on education but on the society in general. "The basic problem now is not how to introduce the computer into education but how to build education in the presence of the computer" (Sendov, 1986, p. 16). Characteristic of the second wave is the systematic reassessment of the objectives and goals of separate educational disciplines as they implement powerful information processing capacities. This new capacity enables educators to reevaluate their instructional processes. "Computers as information processors have become

a popular metaphor in pedagogical theory " (Sendov et al., 1986, p. 17).

Trends in Educational Technology.

In 1983 the Harvard Graduate School of Education convened an Educational Technology Center panel sponsored by the U.S. Department of Education's Office of Educational Research and Development, the Carnegie Corporation, the Office of Technology of the U.S. Congress, and the ETC Industry Group (composed of Apple Computer, Hewlett-Packard, Control Data Corporation, Digital Equipment Corporation, IBM, and Texas Instruments). The purpose of this panel was to explore the ways in which the new information technologies could be used to help improve the learning and teaching of mathematics, science, and computing at the primary and secondary levels (Nickerson, 1988). To achieve this purpose, the panel projected a list of probable innovative technologies that would impact on education. Perceived trends in technology were discussed by the panel members with the purpose of influencing the direction of educational technology. A target date was set for the year 2020.

Nickerson (1988) has predicted ten trends in instructional technology: (1) Speed of devices used for computing and storing information will continue to increase as their size, power requirements, and cost decrease.

(2) Computer systems will commonly realize orders of magnitude increases in computing power by exploiting parallel multiprocessor architecture. (3) Remote wireless terminals will provide access to computer networks and to widespread central repositories of data. (4) Microprocessor-based computing power will be in nearly all aspects of our lives: household appliances, hand tools, games, toys, and clothing. (5) Software will be available for an increasingly extensive array of appications, and much of it will have potential for serving educational purposes. (6) Software will be developed that will permit the supplementing of conventional texts with dynamic graphics, including process simulations, that can enhance the effectiveness of expository material. (7) Multimedia communication facilities, allowing the mixing of text, video/computer images, and speech will become widely available. (8) User-oriented languages and "front ends" to applications software will become increasingly easy for people without technical training to use. Systems with useful aspects of natural language and limited speech input and output capabilities will proliferate. (9) Computer-based information services addressed to a diversity of objectives will also proliferate. (10) Increasingly powerful tools to facilitate interacting with very large data bases, both for directed searching and for browsing, will be developed (Nickerson, 1988, p.2).

Nickerson continues to ask not what can technology do but rather what should be done (1988, p. 3). Educators planning for the future face two questions: What skills do learners of the next century require? and What does it mean in today's world, or the future, to be educated? Nickerson replies that the educated person acquires (1) domain-specific knowledge, (2) generally useful cognitive skills, and (3) the ability and desire to learn.

Knirk and Gustafson (1986) discussed the use of trend extrapolation as a technique for projection on an intermediate-range basis. This technique uses history as a baseline for projection requiring relatively little time to make a forecast using a mathematical equation and a trendline procedure. While trend extrapolation provides good to very good prediction on a short to intermediate basis, five years of data are required and the procedure is weak on predicting actual turning points (Knirk & Gustafson, 1986).

The Role of Community Colleges

The Community College.

Monroe (1974) described the community college as the fulfillment of the American promise to its citizens for universal education. While this is a broad definition, community colleges are unique to their communities.

Community colleges realize an autonomy to adjust to their surroundings and provide such services as are needed by their communities (Carter, 1986). "More than any other segment of the educational system..the community college has the freedom to experiment, to explore new paths of learning, to break with traditional methods of teaching, and to become a unique and innovative educational agency" (Monroe, 1974, p. 25).

Moore stated: "A social institution is revealed by its objectives" (1974, p. 25). Objectives for community colleges, for all of their individuality, must take into consideration a divergent student population. The wide range of potential students,--old and young, of varying intellectual abilities, and different educational goals--forces each community college to formulate a variety of objectives.

The comprehensive mission of the commuity college has been defined by Cross (1982) as providing five program areas: (1) career education, preparing students for occupations; (2) compensatory education, enhancing literacy through remedial studies; (3) community education, reaching out with extended services; (4) collegiate function, new directions for the liberal arts; and (5) general education, developing an integrated curriculum. "Comprehensiveness is a strategy that was used with reasonable success by most community colleges in the 1970s and 1980s" (Cross, 1985, p.

35). This strategy is one means by which community colleges attempted to achieve excellence as they carried out their missions.

Cross (1985) referred to a comprehensive component as one of five foci critical to a community college's role in higher education. A second component, the vertical focus, refers to the college transfer program in the comprehensive mission of community colleges. This component provides a vehicle to push or pull students through the educational system from high school to a baccalaureate degree. This higher education model provides opportunities for minorities and disadvantaged students in a formal educational setting. However, breakdown in this vertical component is evidenced by low retention rates. Better articulation between high schools and colleges is a high priority.

A horizontal focus, the third of Cross's components, results from interaction of the community college and local business and industry. In this model, industry becomes a full partner in the mission of the community college, offering employee training on the campus or at the worksite. This horizontal "linkage" with corporations becomes an important component to bring higher technology into the domain of the community college (Feldman, 1985).

Community colleges have always had a strong technical component in their missions. Many community colleges originally were designed as technical colleges to produce

technical graduates to fill positions in local industry. A major emphasis in recent years has been the Tech Prep program, which utilizes the community college to strengthen the technical training of graduates by implementing a strong academic component into their curricula. The program begins with juniors and seniors in local high school and integrates their academic and technical programs into that of the college. Community colleges have the major obligation of providing leadership and establishing smooth connections to enhance the flow of students through the system (Cross, 1985).

The fourth of Cross's components is the integrated focus, which supports Cohen and Brawer's (1980) emphasis on a sequence of intended learnings process. This sequence is a pattern of multidisciplinary courses, team teaching, and curriculum development across departmental lines: in general, it follows many of the current proposals generated for the improvement of general education in higher education. Cohen's intent is to make liberal arts and the humanities an important part of the learning experience of all learners. This integrated focus would place liberal education for the informed citizen at the hub of career, compensatory, collegiate, and community education. Under this influence, community colleges would require and guarantee a liberal education to all adult learners.

To encourage students not accepted at four-year colleges, the Carnegie Commission on Higher Education urged community colleges to adopt an open-door policy, which, in essence, waved admission requirements for community college students. While this open admission does not apply to many technical programs, it did offer all students an equal opportunity for a higher education (Cellucci, 1989). The commission called for community colleges to assume residual responsibility for youth (Carnegie Commission, 1972). This entailed community colleges' developing a comprehensive service system to include guidance, job preparation, job placement, referral service for legal and medical advice, and other functions to help young students become responsible citizens.

Student Population.

The community college provides services to a diverse student population. Through noncompetitive entrance requirements, students who would never otherwise attend college gain an opportunity to obtain a higher education. Community colleges are not only convenient and accessable; they offer a wide selection of professional and technical fields of study (Brubacher & Rudy, 1976). As alternative sources of education and training, community colleges attract students characteristically nontraditional (Nickerson, 1988). These students, viewed as a group, are

high risk academically. Reasons for this potential failure include the fact that community college students tend to have very diverse goals (Smith & Beck, 1984). Many have families and full-time jobs, and are often first generation college students. Consequently, they have no family models available to offer support and knowledge of skills necessary to be successful in a college environment. Limited external support is available to these students (Cellucci, 1989).

Demographic trends have far-reaching implications for community colleges. The number of minority students is increasing. The average age of Americans is rising as life expectancies increase and birth rates decline. A dramatic change in the new role of women in the work force is evident despite the fact that 70% of them have dependent children (Fey & Hanakin, 1985).

As new industires flourish and others are phased out, workers find themselves in a state of transition. Emerging technologies and reliance on informational services force many adults to retrain at their local community colleges. This new demand for education, with its increasing emphasis on continuous education, opens up unprecedented demands on students and opportunities for community colleges (Fey & Hanakin, 1985).

The Community College and Technology.

Tillery and Deegan (1985) reported a trend in community colleges to respond to increasing needs for new technologies for management and instruction. Regional cooperation among colleges and with high-tech industries will be essential for access to state-of-the-art equipment and facilities in some areas of instruction and management. As accountability becomes more of a factor, state appropriations will depend upon maintaining efficient management (Tillery & Deegan, 1985).

Proliferation of educational technology has led to new literacies. "The new media/telecommunication/computer technology has introduced to us what might be defined as the new literacies" (Hefzallah, 1990, p. 16). To become educated in the informational age, adult learners must possess basic information about these technologies. Employers recognize the importance of technological skills. The growth in education and training within business and industry has been dramatic. "The total educational effort of corporate America is astonishing in size" (Feldman, 1985, p. 178). Levine (1980) indicated that industry spends almost as much for education as all public postsecondary institutions.

Corporate-college linkage agreements have been established between community colleges and local business and industry. These are contract training programs in areas

such as business and industry, health care, government agencies, service agencies, and others. While many of these linkage contracts deal with high-tech training programs others are concerned with literacy, adult basic skills, and high school diploma programs (Feldman, 1985). Distance education courses have increased dramatically. Students utilizing a combination of broadcast or cablecast television, computers, and telephone access are overcoming problems encountered with schedules, family, and handicaps.

Decision Making

The purpose of decision making is to create outcomes that maximize the values of the decision maker (Birnhaum, 1988). Ideally, the rational decison maker knows all the information, considers all the alternatives, evaluates and compares all sets of consequences, and selects the best alternative. However, reality suggests that this process is always limited or bounded in some way (March & Simon, 1958). The decision-making process implemented by an institution reflects the management model utilized by the institution (Baldridge, Curtis, Ecker, & Riley, 1977). Management models are often not selected by any organized process capable of consideration of all options and optimum alternatives. The decision-making process may be complacent with the status quo (Allison, 1971).

The difficulty of decision-making reflects two factors: (1) the degree of agreement behind the decision, and (2) the variability of knowledge regarding the probability of success of the decision (Pascale & Athos, 1981). A decision is more easily made when agreement among superiors and subordinates is high. When agreement level is low and the knowledge levels concerning the decision's success vary, decisions are more difficult.

Decision making may be simplified into three phases: alert, analysis, and action. Awareness of a problem which requires a decision defines the alert phase. The analysis of the problem leading to possible solutions is the second phase. Finally, in the action phase, the decision is implemented (Boyd, 1984). Cellucci (1989) stated that in reality, decision-making is much more complex than this three phase model suggest. Problems are often dealt with conveniently, according to a prescribed method or established protocol. While March and Simon (1958) described decision-making as "bounded in rationality", responses to problems do not always result in solutions.

Internal and external constraints affect decision-making. Internally, these include division of labor, employee roles and expertise, time pressures, and organizational climate and values (Cellucci, 1989). Leadership characteristics and type of governance utilized by the organization influence the decision-making process.

Externally, the organization must not only respond to political influences and changes but opportunistically adapt to them (Baldridge, 1971).

Models of Decision-Making.

"A model is an abstraction of reality that, if it is good enough, allows us to understand (and sometimes to predict) some of the dynamics of the system that it represents" (Birnhaum, 1988, p. 83). Birnbaum described four models of organizational functioning. Birnbaum uses Allison's (1971) three models of political, bureaucratic, and collegial as well as a fourth, the anarchial model. Such models organize the way decision-making is perceived. Models serve to focus attention on some particular organizational function thereby allowing decision-makers to deal with designated problems. Models organize the way the decision-making process is perceived. While each organization is unique, characteristics may be identified that are common to institutions that have size, mission, or population similarities (Cellucci, 1989).

The Political Model.

The first of Birnbaum's models is the political model first developed by Baldridge (1971) to depict governance at New York University. Organizational politics involves acquiring, developing, and using power to obtain preferred

outcomes in situations in which groups disagree (Pfeffer, 1981). This model depicts an organization composed of independent individuals and autonomous groups that require an interdependent cooperation to function. Political systems can be identified by social exchange and mutual dependence as differing factions compete for necessary resources.

The Bureaucratic Model.

Weber (1946) identified a bureaucratric model as employing a hierarchial system with many layers of management. Bureaucracy refers to the type of organizational structure designed to accomplish large-scale administrative tasks by systematically coordinating the work of many individuals (Blau, 1973). This model is characterized by vertical lines of authority or communication that represent the way work is supposed to flow through the college. Information flows up through the vertical lines while decisions or directives flow down (Birnbaum, 1988). The process of change is seen as a minor concern and the status quo is sought. When conflict occurs, it is of a controlled nature (Baldridge, Curtis, Ecker, & Riley, 1977). The formal process of decison making is directed by a rational leader who controls, plans, and directs the work of subordinates (Allison, 1971).

The Collegial Model.

The collegial model is characterized by "consensus, shared power, common commitments and aspirations, and leadership that emphasizes consultation and collective responsibilities" (Birnhaum, 1988, p. 86). This is a community of peers in which status differences are deemphasized. Bowen and Schuster (1986) suggested that the collegial model has three components: (1) the right to participate in organizational affairs; (2) the right to membership; and (3) egalitarian treatment that precludes preferential treatment. In this model, change and conflict are not viewed as major issues. Decision making is a shared process involving equal input among the members of the community (Cellucci, 1989).

The Anarchial Model.

This model describes an organization where all persons do what they wish (Birnbaum, 1988). Birnbaum indicated that decisions in this model are made by whatever process emerges but without explicit accommodation and without explicit reference to some superordinate goals. The decisions of an anarchial system are more consequences produced by the system than intentional deliberate selections by individuals (Cohen & March, 1974). An organized anarchy exhibits three characteristics, (1) problematic goals, (2) an unclear technology; and (3) fluid participation (Birnbaum, 1988).

Technology, in this sense, is defined as characteristic processes through which organizations convert inputs to outputs. Decison making processes are unclear when goals are vague and no one knows exactly how the technology works (Cohen & March, 1974). The anarchial model describes a complex organization where many variables and potential interactions prevent a complete understanding and interpretation of the organization's goals and mission.

Participants in Decision Making.

Hersey and Blanchard (1982) described leadership as dependent upon the maturity and expert level of the followership within an organization. Professionals as a group seem to want to participate in the decisions. Those affected by a decision want to be part of the planning and deciding processes (Bennis & Nanus, 1985). Persons not involved in the decision process become resentful of changes imposed upon them. Ultimately, subordinates determine whether an innovation or change in their organization will be successful (Boyd, 1984).

Successful innovation of new programs and technologies requires involvement of all participants associated with the mastery of change (Kanter, 1985). An advantage of participatory decision-making is that once the decision is made, it tends to be accepted and long lasting (Hersey &

Blanchard, 1982). These evolutionary changes can take great amounts of time and energy.

Decision-Making Structures in Community Colleges.

College environments exhibit an "interaction between inexorable constraints and pressures, on the one hand, and the free choices of the many individual actors, on the other, in the unfolding drama whose next act is a secret" (Kerr, 1985, p. viii). Rational decision making seeks to create outcomes that maximize the values of the college culture or the decison maker (Birnbaum, 1988). The rational administrator bases decisions on knowledge of situations and applies scientific management procedure to determine an optimum solution. However, much of college decision-making involves intangibles and powerful politically independent subgroups competing for finite resources. Decision-making structures needed for colleges and universities can be complex. While nonacademic functions are normally handled as a bureaucratic business enterprise, academic functions may be collegial, political, bureaucratic or some combination of the three. Childers (1991) described a continuum on which decision-making structures exist. The collegial structure is on one end of the continuum with bureaucratic structures on the other. Political structures lie somewhere in between. Existing decision-making structures can be expected to have characteristics of either

collegial or bureaucratic systems (Becker & Gordon, 1964). Bess (1988) argued that the culture of a college determines the structure orientation. "Rationality and trust lead to collegiality while irrationality and distrust give the college a political orientation" (Bess, 1988, p. 75).

"The more complex the institution, the more authority for the execution of different functions is spread traditionally across both administrative and faculty personnel settings" (Bess, 1988, p. 156). In organizations such as colleges, the dominant coalition or central authority in power determines the routine or nonroutine nature of a problem. This authority also determines the strategic or tactical nature of a problem based on an interpretation of the environment (Aldridge & Pfeffer, 1976). Bacharach and Lawler (1980) identified authority and influence as types of power. Authority comes from organizational structure or college governance hierarchy. Power drawn from such a structure involves coercion, remuneration, information, and manipulation of consensus and norms. Bacharach and lawler (1980) further described influence as power stemming from personality, expertise, or opportunity.

Conflict exist within the internal and external environments of an organization. Perceptions of (1) the environment, (2) the nature and quality of data, and (3) the thresholds of action result in the existence of many

alternative views of college management (Bess, 1988). While the appearance of decision-making processes is apparently unique to individual colleges, any decision-making structure is responsive to four forces: (1) vertical flow of information within the hierarchy; (2) coordination across parallel units in the organization; (3) strength of cultural norms; and (4) exercise of political strength of subgroups (Bess, 1988).

Parsons (1951) described a framework of four functional prerequisites necessary for organized social system to survive. These are adaptation, goal attainment, integration, and latency. Organizational decision making is a process whereby one of these four areas receives attention (Bess, 1988).

Decision making can be viewed from a systems perspective. Bess (1988) described four decision domains that are established and controlled through the design and manipulation of interrelated organizational mechanisms that orient and direct workers. The first domain, inputs, involves both enabling inputs and raw material inputs. The enabling inputs are personnel or resources while raw material inputs may be viewed as students. The second domain involves the transformation of raw material. These decisions involve adaptation and integration of resources, technologies, and design. The third domain is the quality of outputs produced by the system. Finally, the fourth

domain involves feedback to provide information regarding output quality and monitor the transformational process.

Control of vertical and horizontal flow of information is a form of power found in both authority and influence. The need for this information flow is influenced by the nature of the school's environment, technology, size, and mission (Pfeffer, 1981). "The degree to which authority is dispersed in efficient ways is also determined by the type of organization being considered" (Bess, 1988, p. 71).

Pfeffer (1981) identified four basic kinds of organizations in relation to (1) the amount of authoritative control and (2) consensus regarding goals and technology. These contingencies result in four organizational models. The professional model has authoritative control and low consensus; bureaucratic model has high authorative control and high consensus; the political or coalition model has low authoritative control and uncertainty regarding goals and technology; finally, the fourth centralized model has uncertainty regarding goals and technology and high authoritative control.

Summary.

The review of the literature has indicated that the impact of technological change is transforming our society. Our perceptions of learning and education are altering as we adopt new technologies and systems into our culture.

Concepts such as computer as metaphor, the global village, the medium is the message, and nonneutral technology exemplify new perceptions of communications and computerization.

Educational technology is an emerging discipline based on sound psychological research and incorporating effective technology and strategic necessity. The need for effective training is a dominant theme in the post-cold war era and the resulting emphasis on a global economy. In the past decades, a succession of instructional systems have evolved from the interaction of new technologies and methods of instruction. The latest generation of educational technology provides interactive, computer-assisted learning involving data base systems, fiber optics, satellite communications, and sophisticated instructional networks.

The community college is challenged with a comprehensive mission in an era of great change. This challenge includes providing technical training for adult learners, the current and future industrial and business work force. These students are from a variety of backgrounds and have a variety of skill levels. Reduced federal and state revenues put a severe strain on community college resources at a time when educational services are in greatest demand. All educational facilities are becoming more accountable for production of quality education.

A crucial area linking media technology and effective learning lies within the domain of the decision maker. Decision making at a specific institution may follow one of four organizational management models. The use of participatory management models appears best suited for decision making in contemporary organizations. These models, however, are not necessarilly the decison-making procedures incorporated in educational facilities. Thus, the very process of deciding to change also requires change in decision-making processes. It is within this complex problem area that the current research was undertaken.

CHAPTER III

METHOLOGY

The purpose of this study was to investigate the decision making process involved in the (1) control, (2) allocation, (3) purchase, and (4) utilization of educational technology in a community college. Two additional objectives are (1) to compare faculty and administrative perceptions regarding the decision-making process, and (2) to identify separate formal and informal communication systems involved in the decision-making process. A survey of existing literature reveals no studies involving decision making and educational technology utilization at a community college. This was, therefore, an exploratory investigation seeking a broad understanding of the problem areas at a specific institution. This study was constructed due to the problems regarding the infusion of innovative educational technology at all levels of community college function. While the array of problems resulting from technological change is vast, this study focused on the specific interaction of the user of technology and the college decision making process. The study was limited to two aspects of this problem. The decision making process as it affected the control, allocation, and purchase of educational technology was the first. The second was the unitization of education technology by the faculty.

Case Study

The goal of this case study was to develop a more complete understanding of the decision-making process at a community college. Qualitative methods were employed to gain an in-depth awareness of problems and needs associated with the utilization and allocation of educational technology by the faculty and administrators. All anticipated contact of the faculty with educational technology was included in this study. All anticipated phases of decision-making by administrators and faculty were also included. Allowances for unanticipated contact and decisions were included in the study as well.

Qualitative analysis was used to describe the following: (1) the role of individuals in decision-making; (2) the procedures involved in educational technology acquisitions; (3) faculty needs and utilization; (4) generalizations concerning more effective means of generating decisions regarding educational technology; and (5) current problems and changes impacting on the college regarding educational technology.

While no literature specifically addresses this problem, several studies have contributed insights into the problems addressed in this research. Norris (1985) utilized a naturalistic inquiry process in evaluating the Professional Support Center at Reading Pennsylvania Area Community College. This committee report developed

effective evaluation procedures incorporating surveys and interviews. Evaluations were conducted of all departments as part of a curriculum enrichment four-year cycle.

Wenger and Lemme (1987) developed an institutional plan for computing at Dupage Community College in Illinois. This study was a comprehensive plan for evaluating all aspects of microcomputing at a large, 29,000-student community college. Separate surveys were developed for faculty, administrators, and students, to determine computing and software needs for the entire college.

Cellucci (1989) utilized qualitative methods to describe the decision-making procedures of a small community college in South Carolina as it developed a student admissions policy. This study was conducted over a period of years and includes in-depth interviews with student admissions committee members.

Boone, March, and Wilkins (1989) used delphi techniques to complete computer utilization surveys at rural, suburban, and urban public learning resources centers. Carrott (1990) at Chowan College utilized management information systems and computer analysis to aid in making decisions regarding a foreign language program. Bunting (1989) at Scottsdale Community College, Arizona, analyzed distance education users in an effort to improve satellite telecommunications services. While these studies gave insight into advantages

of qualitative methods, none addressed problems associated with both decision-making and educational technology.

A holistic approach was selected for a research design due to the complexities in the relationship between decision-making and educational technology utilization. Data were collected through (1) a survey of faculty utilization of educational technology; (2) interviews with decision makers; and (3) document searches. This triangulated method was used to increase the reliability of the collected data.

The population involved with the study was employed at a medium-sized community college in the piedmont area of North Carolina. The population was subdivided into two groups: (1) the decision makers, consisting of six administrators and (2) 42 full-time faculty members. The college ranks 28th in full-time-equivalency (FTE) among the 58 North Carolina Community Colleges. Its total budget is five million dollars. All of the administrators and 95% of the faculty participated in this study.

The Decision Making Process

The impact of new and significant educational technologies have forced college faculty and administrators to make hard choices and changes in their perceptions and approaches to their work. Technologies and procedures unheard of in the late 1970s create opportunities for the

average educational practitioner. But with these opportunities come problems, concessions, renewed commitments, and difficult decisions.

Most decisions involve bureaucratic procedures, lines of communication, and specific interests of individuals and groups. While an idealistic pattern of decision making can be predicted based on procedures, communication, and interests, a realistic pattern involving crisis and politics will emerge as well. Both patterns need to be identified. An idealistic pattern can be drawn from individual roles and responsibilities taken from job descriptions in the college faculty handbook.

A purpose of this study was to construct a realistic pattern involving actual functions of individuals as they acted out their roles and responsibilities. In actuality, an operational pattern, dependent upon situations and over-riding an ideal pattern, is likely to be one implemented by a community college administration.

Administrative decision making can be expected to be perceived by the faculty differently than by the administrators. Identification of this perceived difference was a goal of this study. In an effort to assess possible differences, similar questions were asked of administrators and faculty members alike to identify attitudes and perceptions.

As this study involved only those decisions affecting the control, allocation, and purchase of educational technology, only those decision-making patterns were investigated. The three components--control, allocation, and purchase--were tracked congruently. Each of the three components had an important role in the decision-making process. This process was charted with schematics. A schematic pattern of idealistic decision making was contrasted with a pattern of realistic decision making.

All individuals involved in the decision-making process were interviewed to determine their role in the process. Assuming that the process may vary as to the price or complexity of the educational technology undergoing processing, several items of educational technology were selected for tracking. Two large-dollar items or systems, two middle-priced items, and two inexpensive items were selected for study. These three items were selected randomly from invoice numbers of items purchased by the college during 1991-1992. Expenditures for educational technology are well documented at the college. The paper trail of these expenditures includes signatures of (1) the individual requesting the item, (2) a department head or dean, and (3) the Vice President for Business. All expenditures originate from specific accounts. Analysis of yearly expenditures yields information as to budgetary

priorities, names of individuals requesting educational technology, vendor information, and cost per item.

Faculty Utilization

This study identifies the community college faculty as the users of educational technology. Although this is not always the case, the faculty does represent the primary interface with the product of the college, its students. It is the through the faculty that curriculum is developed and implemented. It was the faculty that this study targeted to provide data on educational technology utilization.

This study investigated four aspects of educational technology utilization:

(1) Requested. What educational technology did the faculty request through formal channels? What items were indicated on requisition forms? Were these requests granted?

(2) Obtained. What educational technology did the faculty obtain? Did they share these items with other faculty members in their department or in other departments?

(3) Utilized. What educational technology did the faculty use? How extensively?

(4) Anticipated needs. What educational technology did the faculty need for immediate use or in 2 years?

These data were collected through use of a survey questionnaire, which was distributed to all full-time faculty members. Besides asking questions related to the four aspects of utilization, questions were asked regarding the role of the faculty in the decision-making process. Attitudes regarding educational technology and the changes the technology demands were surveyed. Faculty concepts of educational technology both in the present and in the future were also surveyed.

Study Methods

This study addresses the following questions:
(1) What is the relationship between the decision making process and the use of educational technology?
(2) How do decision makers select educational technology?
(3) What are the procedures for governing control, allocation, and purchase of educational technology?
(4) What educational technology do faculty members use and need?

Three methods--a survey questionnaire, document searches of files and records, and interviews--were utilized to answer these questions. These survey techniques were intended to evaluate the present decision-making processes and assess the current and future use of educational technology. Through analyses of the data collected by this

evaluation, the relationship of the decision making process and the user of educational technology can be generalized.

The first question required identification of the decision making process and assessment of the use of educational technology. An analysis of the relationship between the two was the major focus of this study. The second question was answered through questions directed to decision makers: (1) what influences their decisions, (2) how do they obtain information and training regarding educational technology, and (3) how do they reach decisions. Question three was answered through questioning personnel and tracing the decision process through documented school records.

Three survey methods evaluated each of the three different aspects of the study. Faculty utilization of educational technology was determined by using a questionnaire. The decision-making process was tracked by interviewing the decision makers and identifying their roles in the process. Input from both the faculty and administrators was solicited to develop accuracy in both instruments and promote a stakeholder component in the overall study (Weiss, 1986). Existing records and documents were reviewed to obtain data regarding documented request, authorization, and purchase of educational technology (Berdie & Anderson, 1974). Finally, all of the data were analyzed to answer the four research questions.

The Questionnaire.

Data were collected from the faculty through a questionnaire developed for this study. The questionnaire format provided a uniform question presentation to all faculty members during school hours (Berdie & Anderson, 1974). As stated, the design of the questionnaire involved input from both faculty and administration. This effort is analogous to the stakeholder model of evaluation developed by the National Institute of Education (Weiss 1986). While means of checking reliability of a questionnaire is limited, collaboration will help reduce this problem (Berdie & Anderson, 1974). The following steps as developed by Sheatsley (1983) were followed: (1) Decide what information is required. (2) Draft some questions to elicit that information. (3) Put them into a meaningful order and format. (4) Pretest the result. (5) Go back to the first step.

Interviews.

The college's six administrators were interviewed to determine their role and identify their perceptions in the decision-making process regarding educational technology. This method also allows discretionary investigation of unanticipated areas of importance to this study.

Existing Documentation.

Data collected from existing information resources are a readily available source of information (Worthen & Sanders, 1987). An excellent source of available data exist in the community college files. Documentation exists for all educational technology purchased by the school including who requested the item, price paid, who authorized purchase, what source of funding paid for the item, and all dates relevant to the transaction. Budgets for each department was available.

School and departmental goals, objectives, and procedures are available as well. Job classifications illuminate legitimate roles of individuals in the decision making process. The formal aspects of hierarchial organizational structure can be traced through official school documents. Faculty utilization of educational technology was tracked through the Learning Resources Center requests, reservation forms, departmental acquisitions, and personal acquisitions identified in the faculty survey. Responses involving utilization, need, allocations, and request of equipment were compared to illuminate any inconsistencies and patterns concerned with wants, needs, and the acquisition process. Responses were solicited from the faculty to determine any interdepartmental short-term and long-term planning strategy.

Analysis

Analysis of the data provided valuable information regarding decision-making at a community college. Comparisons of information from interviews, a faculty survey questionnaire, and three document searches aided in identification of how the decision-making process relates to the utilization of educational technology at a community college. The administrative roles in the decision-making processes and attitudes of both administrators and faculty members toward new technologies were investigated. Faculty members were also asked to identify their attitudes regarding their role in the decision-making process. Contrasting attitudes regarding administrative roles underscored effectiveness of interdepartmental communications within the college.

Purchased items were tracked through the documentation process. When an individual faculty member or departmental makes a request, it is then routed through the business office after receiving appropriate signatures. Two items have been tracked in each of three categories, high, medium, and low price ranges. This method determined whether any deviation of price or actual purchase or procurement had occurred other than that intended.

Perceived management processes were compared and contrasted with management models. It was possible that no

model fitted this community college management procedure. Therefore, allowances were made to investigate the possibility of new management processes during this study.

This study was primarily interested in decision-making in the context of the allocations of educational technology. The functional role of the decision-makers were identified through their own perceptions, those of faculty members, and fellow administrators. The acquisition process was tracked for high, medium, and low cost items. Faculty utilization of educational technology was identified through use of a utilization survey and documents from the college learning resources center.

CHAPTER IV

ANALYSIS OF DATA

The purpose of this chapter is to describe the analysis of the data collected in this case study. This study concerned the decision-making process affecting the allocation, control, use, and purchase of educational technology equipment at a community college. A variety of information sources were utilized to gather sufficient information to understand this decision-making process and the numerous aspects of educational technology at a community college. The methodology selected for this case study required a triangulated approach including (1) three document searches, (2) a faculty utilization survey, and (3) interviews with college administrators. This chapter focuses on organizing and reducing the data collected from the document searches and interviews while making statistical inferences in the case of the utilization survey. Processes related to decision-making taken from document searches and verified through surveys and interviews will also constitute a portion of the analytical process.

This chapter describes the results of each of the three components of the methodology. Results of each of the three document searches are utilized to construct a portrait of the institution and the framework through which individuals

utilized educational technology and interacted in the decision-making process. Results of a faculty utilization survey determined faculty attitudes, utilization patterns, and participation and knowledge of the process by which new technology was acquired by the college. Results of interviews with each of the college administrators identified the roles, attitudes, and philosophy of the individuals who made up the college leadership and determined the direction technology took on campus.

These results were analyzed to answer the four research questions which formed the focus of this study's data collection.

1) What is the relationship between the decision making process and the user of educational technology?

2) How do decision makers select educational technology at a community college?

3) What are the procedures for governing control, allocation, and purchase of educational technology at a community college?

4) What educational technology do faculty use and need at a community college?

Qualitative analysis of data collected in this triangulated methodology described (1) the role of individuals in decision-making, (2) the process and procedures involved in educational technology acquisitions, (3) faculty needs and utilization, (4) generalizations

concerning more effective means of generating decisions regarding educational technology, and (5) the current problems and change impacting the college regarding educational technology. Supporting tables are included as appendices.

Document Searches

Existing informational resources were excellent means of identifying (1) roles and responsibilities of each college employee, (2) the amount and type of educational technology equipment available for instructional and management use, and (3) the equipment budget for the entire college.

Job Descriptions and Responsibilities.

The following job classifications were taken from the community college Staff and Faculty Handbook. Each job description throughout the college was analyzed for elements of responsibility. Action terms related to equipment allocations used for this analysis were preparation, co-ordination, supervision, and promotion. Only descriptive elements pertinent to educational technology and decision making were listed. Ten positions were identified that were involved with educational technology and decision-making at the community college.

(1) The Vice President for Instruction is responsible for (a) managing resources including personnel, budget, and equipment for all academic departments; and (b) providing leadership for development, approval, and implementation of new educational programs offered by the college.

(2) The Department Chairperson is responsible for selection of supplies and equipment and budgeting for that department. The chairperson is expected to (a) approve requisitions for equipment and approve or disapprove a program request prior to forwarding it to the Vice President for Instruction; (b) assure that programs keep abreast of technology and are in compliance with state and national accreditation standards; (c) participate in budget control. The approve or disapprove provision allows a faculty member to submit a program request directly to the Vice President for Instruction even when the Department Chairperson has disapproved the request.

(3) Faculty members are responsible for (a) classroom teaching; (b) student retention; (c) student and course evaluation; and (d) recommendations for policy formation in the instructional area. According to the college Fact Book, a majority of instructors at this community college teach in technical areas.

(4) The Faculty Secretary prepares supply and equipment purchase orders at the request of faculty members and keeps a log of supplies and equipment ordered.

(5) Program Heads are appointed for each curriculum and are responsible for an inventory of equipment.

(6) The Vice President for Fiscal Services, in coordination with other principal administrators, is responsible for (a) management of all financial operations of the college; (b) preparation of college budgets; (c) management of purchasing; and (d) administration of funds for federally sponsored programs and all college accounts.

(7) The Dean for Learning Resources supervises, coordinates, and promotes audiovisual and microcomputer services for use by the faculty, students, staff, and the community.

(8) The Media Specialist reports to the Dean for Learning Resources and is responsible for (a) coordinating audiovisual hardware and material purchases; (b) developing and administrating policies and procedures for equipment loans; (c) advising and training faculty, staff, and students in the proper operation and use of audiovisual equipment; and (d) assisting students, staff, faculty, and community organizations in selecting the most appropriate communications media for their needs.

(9) The Director for Auxiliary Services and Purchasing is responsible for (a) inventory control of all equipment for the college, (b) procurement of all operating equipment and supplies, and (c) shipping and receiving to include

reconciliation of receiving reports and invoices with purchase orders for payment.

(10) The Assistant to the Vice President for Instruction maintains and processes records regarding all instructional equipment and supplies materials.

Committees.

The community college has five committees that play important roles in the allocations and utilization process related to educational technology: (1) The Learning Resources Center Committee serves in an advisory capacity to the Dean for Learning Resources and the Vice President for Instruction. According to the Staff and Faculty Handbook, this committee focuses on areas including an annual patron survey, mission statements, and general improvement. All committee recommendations requiring administrative approval go before the Administrative Council.

The second committee is the Administrative Council comprised of the Vice President for Fiscal Services (Budget), Vice President for Student Development, Vice President for instruction, Vice President (of a satellite campus), Assistant to the President for Public Information, Dean for Learning Resources, Dean for Corporate and Continuing Education, Administrative Assistant to the President, Director of Planning and Development, Chairman of the Faculty Senate, Chairman of the Staff Council, and the

President of the College. The College President chairs the meetings, makes appointments to the committee, and invites other appropriate staff and faculty members to participate in specific meetings of the council. The Administrative Council is an advisory organization providing information, suggestions, and justifications to the college's Executive Council.

The Executive Council, the third committee, has the ultimate decision-making authority over equipment allocations for the college. While this groups requests input from each department of the college, it makes major decisions regarding educational technology in that it allocates budgets for equipment purchases for each department.

The Planning and Institutional Effectiveness Committee coordinates the process by which the college develops its Institutional Educational Blueprint. This is a working document that defines alternative courses of action for the future and plays a key role in decision-making and resource allocation for the college. According to the Vice President for Instruction, however, this role of resource allocation is minor. The major duties of this committee are to provide a framework to the college for revising and updating the Mission Statement, the Planning Assumptions, and Institutional Goals and Objectives, and monitoring the evaluation and assessment process for identified goals and

objectives. Educational technologies are important to attaining these objectives as well as providing technical systems to collect and analyze data. Over two thirds of the members of this committee are also members of the Advisory Council. The four members of the Executive Committee serve on both the Advisory Council and the Planning and Institutional Effectiveness Committee.

Finally, the Computer Resources Committee serving in an advisory role to the Administrative Council and the President, develops a comprehensive, annual campus-wide computer plan fpr a;; areas--academic, student services, and fiscal. All requests for computer hardware and software are reviewed by this committee to insure compatibility with the campus computer plan.

The college Staff and Faculty Handbook does not specify any mechanisms by which educational technology requests are processed and allocation decisions are made. The Vice President of Instruction acknowledged that the college has not included any allocation processes in literature available to staff and faculty.

Schematic of the Ideal Process.

Individual roles and responsibilities, as identified in several job descriptions found in the college's faculty manual, relate to educational technology and decision-making. A bureaucratic construction based on these job

descriptions could define the ideal decision-making process dealing with educational technology allocation. This ideal label identifies the process as one ideally suited to the college needs as indicated by the college's Staff and Faculty Handbook. This handbook is provided to faculty and staff and describes procedure and protocol that prototype the activities of college employees. The following schematic tracks an educational technological (equipment) request through the process as identified by the job descriptions specified by the college. Schematics detailing the ideal process pertaining to individual roles and responsibilities are found in Figure 2. The ideal process concerning committees is found in Figure 3.

Figure 1

Ideal Schematic for Individual Roles and Responsibilities

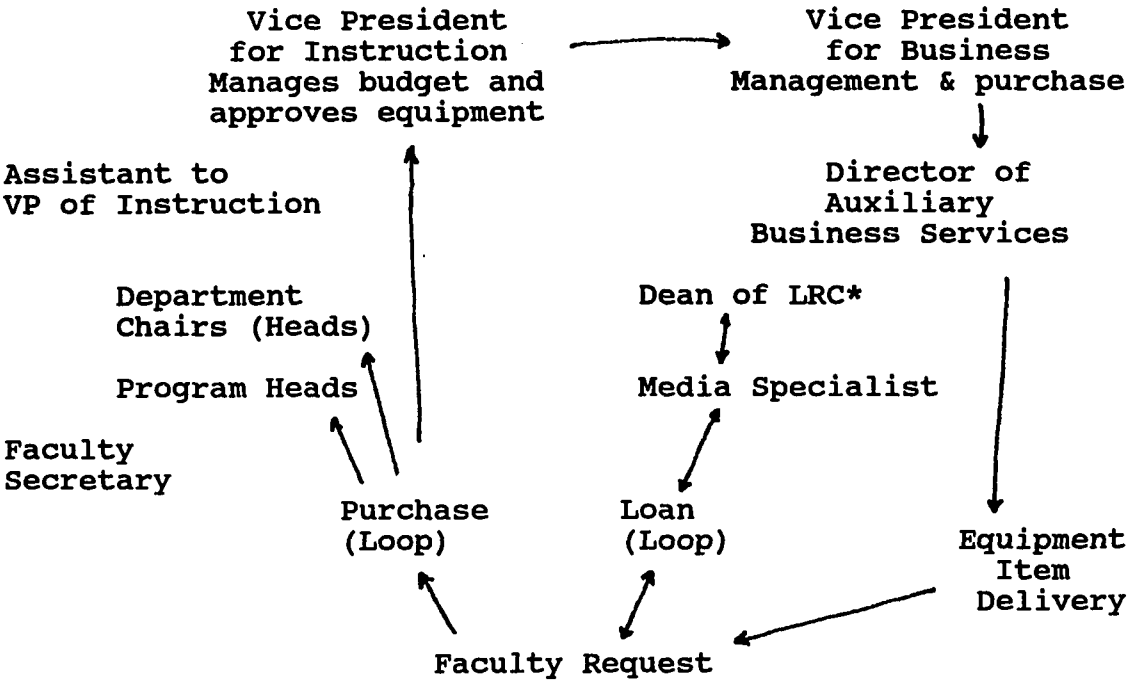
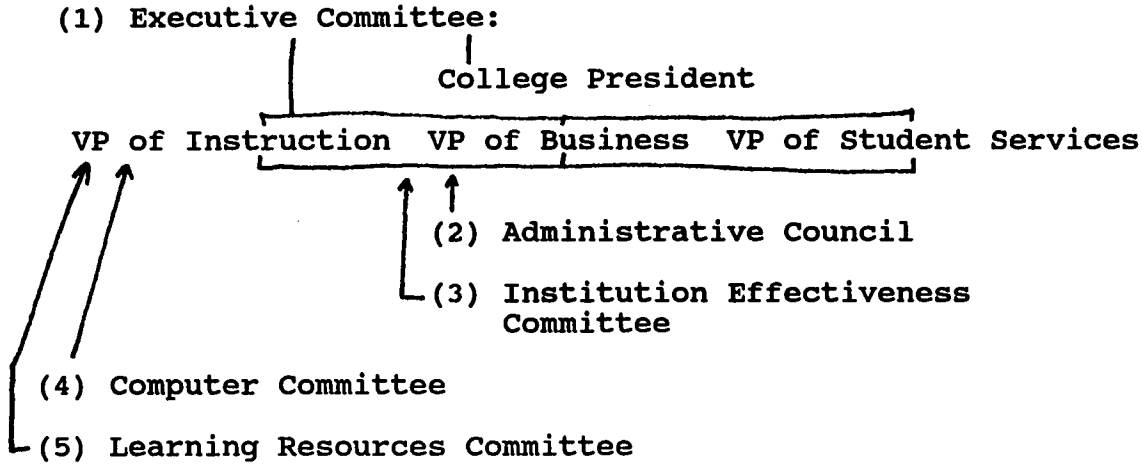


Figure 2

Ideal Schematic for Committee Input



Available Educational Technology Equipment.

The community college makes educational technological equipment available in two ways. Equipment purchased by individual departments was controlled and inventoried departmentally. Departmental equipment was allocated to laboratories or specific classrooms or assigned to individual instructors. This equipment may be utilized for off-campus instruction, clinical situations, or workshops or seminars. In actuality, few pieces of equipment termed audio-visual are included in this category. However, many components of educational technology such as personal computers, printers, word processors, lasers, computer-controlled machines, liquid crystal display equipment, medical-related, diagnostic, and instructional machinery are inventoried by individual departments.

An educational technology equipment inventory compiled by the Learning Resources Center lists 90 pieces of equipment. An equipment list is supplied in Table 1.

Equipment Loan Through the Learning Resources Center.

Educational technological equipment loaned out to instructors for both on-campus and off-campus use has been documented for the fiscal year beginning July 1991. The totals are somewhat misleading as the reservation forms used by the college indicate "one use" for a reservation that may cover the entire quarter of classroom utilization. The number of times and the length of time equipment is actually

in use is unknown. The figures are compiled from reservation and checkout information reveal a comparison of the amount of equipment usage and the amount of equipment inventoried by the college (see Table 5).

Table 1.

Learning Resources Center Equipment Loan Request

Quantity	Equipment Type
6	Television videocassette combination Units,
6	Videocassette recorder/player units
15	Television/monitors
12	Overhead projectors
9	Slide projectors
8	Sound filmstrip projectors
4	Audiocassette recorders/players
6	Video production/editing units
4	Portable public address systems
3	Record players
10	16mm movie projectors
1	Opaque projector
1	laminating roller
1	16mm loop movie projector
3	Filmstrip viewers
1	Audiocassette copier

Table 2.

Monthly Totals for Audiovisual Equipment Use

Month	FP	MP	SP	VCR/TV	Other	Totals
July '91	1	1	2	20	11	34
Aug. '91	1	0	4	15	26	46
Sept.'91	3	1	8	16	25	53
Oct. '91	0	0	4	17	10	31
Nov. '91	1	0	2	23	15	41
Dec. '91	0	0	0	10	8	18
Jan. '92	1	1	8	36	26	72
Feb. '92	0	2	4	31	24	61
Mar. '92	3	2	2	30	26	63
Apr '92	0	2	5	31	16	54
May '92	2	0	2	13	9	26
June '92	0	0	1	11	10	22
Totals	12	9	42	253	206	522

Note: FP (filmstrip projector), MP (16mm movie projector), SP (slide projector), VCR/TV (combination of television, VCR, and video monitor), Other (overhead projectors, video editing, transparencies, opaque projector, and individual audiovisual viewers)

Equipment Budget.

Documents obtained through the community college business office detailed expenditures for equipment for 1990 through 1992. Sources of funding for each expenditure were coded for state, federal, and local funds. State funds provided the majority of educational technology equipment. Federal funds provided equipment for specific programs such as Jobs Training Partnership Act (JTPA) but this equipment was not available for loan or use by other departments. A Title III Grant of $200,000 provided the college with instructional and DACUM equipment during a three-year period ending in 1991.

During the fiscal year ending in June 1991, a total of $261,063.10 was spent on equipment by the community college. Of this total the State of North Carolina provided $149,967.38 (57.5%), federal contributions were $68,685.88 (26.3%), and local or county funds totaled $42,409.84 (16.2%). This total was substantially more than the $122,649.79 equipment budget for the fiscal year ending in June 1992. All sources of funding dropped. State funding was $88,096.65 (71.8%), federal funding was $32,477.98 (26.5%), and local funding was but $2,075.16 (1.7%) Substantial reductions in equipment allocations resulted from a recession-motivated drop in state and county revenues. Nearly all budgeted areas of community college operations suffered cut-backs from reduced allocations.

However, the substantial difference in budget from 1991 to 1992 reflected more than cut-backs. Scrutiny of itemized purchase lists revealed that the college had emphasized equipment expenditures in 1991. Local funds had purchased two vans for the college motor pool, which accounted for over half of the total county contribution to the equipment budget. Moreover, 1991 was the last year of a sizable Title III Grant. Also in 1991, the college began a program to upgrade personal computers (PCs) in computer labs for several technical programs and provide PCs for faculty and staff offices. A local area network (LAN) computer system was initiated with a large portion of available state funds. This equipment purchase reflected an administrative decision to upgrade and improve computers throughout the college. Annual funding at that rate was never intended.

Equipment expenditures related to educational technology were revealed in a chart for each of the fiscal years. Tables 4 and 5 indicates expenditures for 1990-1991 and 1991-1992, respectively.

Table 3.

Educational Technology Expenditures for 1990-91

Equipment	Number of Items		Funding Source	
	State	Fed	State	Federal
Computers	20	5	$27,836.19	$13,139.78
Comp. Assesories	7	1	$ 6,273.80	$10,496.36
Printers	11	0	$ 7,869.41	0
Drive Units	1	2	$ 420.00	$ 745.00
Software	7	0	$16,715.90	0
Office Tech	3	0	$ 1,744.71	0
Laser Tech	1	0	$ 2,316.56	0
Copier	1	0	$ 1,779.95	0
Audiovisual	1	3	$ 109.48	$ 922.91
TV/VCR	3	0	$ 1,055.00	0
Totals	55	11	$66,121.00	$23,304.05

The total number of items purchased from state and federal sources totaled 66. The total state and federal funds expended on educational technology equipment was $91,425.05.

Table 4.

Educational Technology Expenditures 1991-92

Equipment	Number of Items		Funding Source	
	State	Fed	State	Fed
Computers	22	1	$34,946.99	$ 6,942.00
Comp Accessories	19	0	$13,670.26	0
Printers	18	1	$11,911.32	$ 310.52
Drive Units	4	0	$ 1,838.03	0
Software	6	0	$ 7,234.16	0
Office Tech	3	0	$10,970.10	0
Work Stations	2	0	$ 564.90	0
Calculators	2	0	$ 124.00	0
Hearing Impaired	1	0	$ 911.00	0
Auto Mechanics	1	0	$ 2,668.92	0
Audiovisual	3	0	$ 1,273.24	0
TV/VCR	4	0	$ 1,173.86	0
Totals	86	2	$86,286.78	$ 7,252.52

The total items purchased from state and federal funds were 88. State and federal funds expended for educational technology equipment totaled $94,539.30.

Analysis of expenditures for equipment designated "educational technology" for the two fiscal years revealed a small increase in overall spending of approximately $4,000. The cost per item for state purchased equipment dropped from $1202.20 to $1003.34 during 1991-91 through 1991-92. Equipment cost per item purchased with federal funds rose significantly over the same time period. However, only a small number of high-priced items skewed the findings for federally funded expenditures for 1991-92. When federal funding for the second year dropped by nearly 60%, however, this drop was covered by an increase in state allocations. The vast majority (88%) of all funding for educational technology was spent on computers, printers, computer related equipment, and software.

Sample Equipment Purchases.

Six educational technology equipment items purchased during the 1991-1992 fiscal year were randomly selected for analysis. Two items were in the price range under $500. Two items were in the price range between $500 and $1500. Finally, two items were priced over $1500.

The low priced items were designated for different areas. One was designated for a single department while the other was audiovisual equipment designated for general use. Both items were requested, processed, and received in a

relatively short time. One item collected all necessary signatures in one day.

The medium priced items were also designated for different areas; one for a single department and the other for general faculty use. The item designated for general use was part of a large purchase. All signatures were obtained within one week for both items.

Both high priced items were related to the college's local area computer (LAN) systems. While one item was a computer drive component, the other was an expensive printer designated for one department but operational through the LAN system. Each of these items were initially requested by a vice president.

The lower priced items were on state contract thus negating the need for bid sheets. Bid sheets were available for the more costly equipment items as required by North Carolina law. Otherwise, paper work for all six items was identical.

Faculty Surveys

Information was collected from the faculty through a survey-questionnaire. Items on the questionnaire were intended to survey all faculty members on perceptions, attitudes, and utilization of educational technology and the decision making that governed that process. Faculty members

were encouraged to make additional comments regarding their perception of educational technology and the decision-making process that may have not been addressed by the survey.

Pilot Test.

The survey instrument was pilot tested at two community colleges in North Carolina. Fourteen faculty members from the two colleges completed the surveys. Analysis of the results indicated that the survey instrument successfully measured an individual faculty member's attitudes, opinions, and utilization of educational technology. Requested comments from the pilot test respondents indicated the questions were expresssed clearly and unambiguously and that they covered the main areas of concern to faculty members. Faculty responses demonstrated general agreement in many attitude and opinion questions as determined by a concentration of answers in a small portion of the response scale. This agreement suggested that as a group they derived the intended meaning from the questions thus granting the questions validity.

Survey Design.

Out of 43 full-time instructors at the community college, 42 completed and returned the survey. Survey responses were first entered into a Quatro Pro spread sheet, similar to Lotus 1,2,3. The data were then transferred to a

statistical software program (SPSSX) for analysis via the University of North Carolina at Greensboro VAX system.

The survey comprised four sections. Section one asked for designation of the respondent as either department head or instructor and curriculum status of the program taught, either technical, vocational, or general education. The second section contained 11 questions which measured faculty perceptions using a five-part Likert-type scale. This section also contained three short written response questions. The third section measured faculty opinions through seven questions using a five-part Likert-type scale. Finally, the fourth section asked three separate questions regarding utilization of a wide selection of educational technology equipment: availability, periodic utilization, and request for purchase.

Eight completed surveys were from department heads. The remaining 34 were from instructors. All department heads were also instructors.

Survey responses were grouped into (1) department heads, (2) general education faculty, (3) technical faculty, and (4) vocational faculty. A mean and standard deviation were computed for responses to each survey item based on the Likert-type numerical scores. An analysis of variance (ANOVA) was used to test the null hypothesis that the means of two or more of the population groupings were equal to each other. The ANOVA results are indicated by an "F"

statistic for each appropriate survey item. These quantitative data are included in the the following tables:

Table 5.

Survey Question Number 1.

I have input into the educational technology equipment selection process.

Value Label	Value	Frequency	Percent
Always	1	4	9.8
Usually	2	15	36.6
Occasionally	3	11	26.8
Seldom	4	6	14.6
Never	5	5	12.2
Mean Score	2.83		
Standard Deviation	1.18		
F Ratio	1.40		

No two groups are significantly different at the .050 level.

The mean response was 2.83 or "occasionally" response to personal input into the selection process regarding educational technology. Standard deviation was 1.18, a mid-range deviation in this study.

Table 6.

Survey Question Number 2.

My requests for acquisition of educational technology are satisfactorily handled.

Value Label	Value	Frequency	Percent
Always	1	9	22.0
Usually	2	17	41.5
Occasionally	3	7	17.1
Seldom	4	4	9.8
Never	5	4	9.8
Mean Score	2.16		
Standard Deviation	0.93		
F Ratio	1.59		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Faculty; Vocational Faculty; General Education Faculty; and Total Faculty.

A mean response of 2.16 indicated faculty "usually" perceived that their acquisitions were satisfactorily handled. The standard deviation of 0.93 indicated a moderate range of responses.

Table 7.

Survey Question Number 3.

School administrators effectively select appropriate educational technology within budget limitations.

Value Label	Value	Frequency	Percent
Always	1	3	7.3
Usually	2	26	63.4
Occasionally	3	8	19.5
Seldom	4	4	9.8
Never	5		
Mean Score	2.14		
Standard Deviation	0.54		
F Ratio	1.12		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Faculty; Vocational Faculty; General Education Faculty; and Total Faculty.

One of the lower response means in this section, 2.14, indicated that faculty members think the college administrators "usually" select appropriate educational technology within budget limitations. This is a consistent perception among faculty members as the 0.54 standard deviation would suggest.

Table 8.

Survey Question Number 4.

I am part of the educational technology selection process.

Value Label	Value	Frequency	Percent
Always	1	3	7.3
Usually	2	10	24.4
Occasionally	3	10	24.4
Seldom	4	10	24.4
Never	5	5	12.2
Mean Score	3.11		
Standard Deviation	1.18		
F Ratio	1.62		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Faculty; Vocational Faculty; General Education Faculty; and Total Faculty.

All faculty perceive that they are "occasionally" (3.11) part of the educational technology selection process. A wide range of scores were evident on this questions with a standard deviation of 1.18.

Table 9.

Survey Question Number 5.

My department has adequate control over acquisition of educational technology for it's needs.

Value Label	Value	Frequency	Percent
Always	1	5	12.2
Usually	2	19	46.3
Occasionally	3	10	24.4
Seldom	4	5	12.2
Never	5	2	4.9
Mean Score	2.39		
Standard Deviation	0.88		
F Ratio	3.73		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Faculty; Vocational Faculty; General Education Faculty; and Total Faculty.

Faculty agreed that their departments "usually" (2.39) had adequate control over acquisitions for their needs.

Table 10.

Survey Question Number 6.

I understand the acquisition/purchase process used by the college to acquire educational technology.

Value Label	Value	Frequency	Percent
Always	1	6	14.6
Usually	2	14	34.6
Occasionally	3	6	14.6
Seldom	4	5	12.2
Never	5	2	4.9
Mean Score	2.87		
Standard Deviation	1.40		
F Ratio	0.46		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Faculty; Vocational Faculty; General Education Faculty; and Total Faculty.

A group response of (2.77) indicated that individuals "occasionally" understood the acquisition/purchase process. The largest standard deviation in this section reveals a wide range of perceptions on this issue.

Table 11.

Survey Question Number 7.

I feel comfortable with new educational technologies.

Value Label	Value	Frequency	Percent
Always	1	5	12.2
Usually	2	21	51.2
Occasionally	3	14	34.1
Seldom	4	1	2.4
Never	5		
Mean Score	2.29		
Standard Deviation	0.71		
F Ratio	1.39		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Faculty; Vocational Faculty; General Education Faculty; and Total Faculty.

The total score of (2.29) and low standard deviation (0.71) would suggest that instructors "usually" feel comfortable with new educational technologies.

Table 12.

Survey Question Number 8.

I contribute to the educational technology knowledge base of my department.

Value Label	Value	Frequency	Percent
Always	1	6	14.6
Usually	2	19	46.3
Occasionally	3	11	26.8
Seldom	4	3	7.3
Never	5	1	2.4
Mean Score	2.35		
Standard Deviation	0.92		
F Ratio	0.98		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Faculty; Vocational Faculty; General Education Faculty; and Total Faculty.

Instructors "usually" (2.35) felt that they contributed to the educational technology knowledge base of their departments. They did indicate a variation in this perception with a standard deviation of (0.98).

Table 13.

Survey Question Number 9.

I seek information regarding educational technology applicable to my field.

Value Label	Value	Frequency	Percent
Always	1	13	31.7
Usually	2	21	51.2
Occasionally	3	5	12.2
Seldom	4	2	4.9
Never	5		
Mean Score	1.90		
Standard Deviation	0.80		
F Ratio	1.46		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Faculty; Vocational Faculty; General Education Faculty; and Total Faculty.

The total faculty indicated they "usually" (1.90) sought information regarding educational technology in their field. Scores were fairly consistent throughout all groups.

Table 14.

Survey Question Number 10.

I feel comfortable with my skill levels operating educational technology appropriate for my curriculum.

Value Label	Value	Frequency	Percent
Always	1	9	22.0
Usually	2	18	43.9
Occasionally	3	11	26.8
Seldom	4	3	7.3
Never	5		
Mean Score	2.20		
Standard Deviation	0.87		
F Ratio	0.33		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Faculty; Vocational Faculty; General Education Faculty; and Total Faculty.

Instructors indicated they "usually" (2.20) felt comfortable with their individual skill levels operating educational technology appropriate for their curriculum.

Table 15.

Survey Question Number 11.

I know where to obtain reliable information regarding educational technology.

Value Label	Value	Frequency	Percent
Always	1	12	29.3
Usually	2	19	46.3
Occasionally	3	6	14.6
Seldom	4	3	7.3
Never	5	1	2.4
Mean Score	2.07		
Standard Deviation	0.99		
F Ratio	0.11		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Faculty; Vocational Faculty; General Education Faculty; and Total Faculty.

Instructors responded that they "usually" (2.07) knew where to obtain reliable information regarding educational technology.

Table 16.

Survey Question Number 12.

When asked who controlled acquisition of educational technology for their curricula, instructors responded by selecting the following:

Category	Responses
Themselves	10
Department Head	14
Vice President of Instruction	10
Vice President of Business	2
Others	3
No Response	2
Total	41

Table 17.

Survey Question Number 13.

I have requested purchase of educational technology for my curriculum this year.

Response Scale: Responses

1 More than 15 times,
2 10-15 times,
3 5-10 times,
4 1-5 times,
5 0 items.

	Faculty Group				
	D. Head	Tech.	Voc.	Gen. Ed.	Total
Mean Score	3.38	3.61	4.40	4.00	3.74
Standard Deviation	1.41	0.76	0.49	1.58	1.15

Faculty Groupings: Department Heads (D. Head); Technical Faculty (Tech.); Vocational Faculty (Voc.); General Education Faculty (Gen. Ed.); and Total Faculty (Total).

The group response for numbers of educational technology items requested for purchase for the past year was (3.74) or 1-5 items. The department heads scored a relatively low of (3.38). Standard deviations were high for department heads (1.41) while low (0.49) for the highest scoring group, vocational instructors (4.40).

Responses to Short-Answer Survey Questions.

Three short-answer questions were included in the survey to determine faculty members' perceptions of the decision-making process regarding allocation of equipment. Each of the questions will be stated and followed by faculty responses grouped by department head or instructor designation and curriculum.

Question #14: Briefly describe the process by which you request and receive needed educational technology.

Department head

(1) Arrive at need, turn in request, substantiate need and what new equipment will do. Submit to Dr. Taylor who determines need over-all for curriculum and communicate decision.

(2) Not attempted yet. Fairly new to the program and college.

(3) Discuss needs with chairperson of Allied Health.

(4) Request submitted to LRC for use. Within the department we often buy from our equipment and supply budgets.

(5) Fill out request form, signed by my supervisor and the VP of instruction.

(6) Order blanks given to the media specialist, ordered videotapes through department budget.

(7) A survey of needed equipment is done by me. I then submit a requisition to the division chairperson for the needed items. Pending its approval I follow the requisition

through the steps internal to the college until the item is ordered. Once the item is placed on order and a purchase order is issued, I then track the progress of the vendor until the item is received. Once received, I verify that the item is working and complete according to speifications.

General education

(1) I simply approach the department head.

(2) Make request to department head.

(3) This year I have discussed purchasing computer hardware and software with Marcia (LRC) and Taylor. This has been by casual word-of-mouth. However, through these conferences I have also made inquiry and obtained information leading to contact with sales reps. I have received demos directly from reps.

(4) Explain needs to the media specialist or librarian. Fill out appropriate paperwork. Follow instructions given by the media specialist.

(5) I contact the media specialist in LRC. He takes over from there.

Vocational

(1) Being new to the faculty, I have not yet utilized the LRC's resources as much as I intend to. However, I have been well handled.

(2) Requisitions.

(3) Observe need. File written request and bids for items to department chair. Department chair forwards to VP of instruction. VP of instruction forward to business office and VP of business. Based on all approval and availability of funds, item is purchased.

Technical

(1) Give to librarian: fill out forms to request equipment.

(2) Prepare equipment needs list.

(3) Written request.

(4) Request submitted in curriculum meetings decided on by program head to be OK'd by department head.

(5) Unsure, as I'm a new faculty member.

(6) Discuss with department head, who in turn gives feedback and will request if funds allow.

(7) Fill out request forms..seek approval from department head...seek approval from VP of instruction..should then be approved by VP of fiscal Services..then ordered.

(8) Request and justify the need and then receive according to funding.

(9) Turn in purchase order.

(10) Check to see if money is available. Find out no money is available. Stop. No major purchase. No equipment.

(11) I ask my department head.

(12) Requisition to department chair to VP of instruction.

(13) Request to chairperson. Chairperson to Dean of instruction.

(14) In a general department meeting, each instructor specifies needs. Department then ranks each need in order of priority until our budget allocation is exhausted.

Question #15: Briefly describe the process by which decisions are made regarding selection and purchase of educational technology at the college.

Department Heads

(1) Don't know.

(2) My request usually involve telecourses. The media specialist and I decide which program we will offer.

(3) Through department head to VP of Instruction to VP of Business.

(4) Don't have a clue.

(5) I guess the requests are received by Lowder and selected with respect to the budget.

(6) Each of the four divisions of instruction are asked for a list of equipment needs. Prior to fall quarter the various program heads are asked to prioritize their needs. When the budget is allocated, divisions are given a general budget into which they are asked to fit purchases for that year. Program heads and division chairpersons work this out and a final purchase plan is given back to the VP of Instruction.

(7) Review within department and with department chair.

General Education

(1) After going to the department head, I have no idea.

(2) Usually made based on funds available.

(3) Need for up-dating purposes and necessity to instructional effectiveness.

(4) Committee selection preferable. Greatest impact would implement and satisfy the greatest need.

Technical

(1) Do not know.

(2) Department Meeting.

(3) Request submitted in curriculum meetings decided on by program head to be OK'd by dept. head..and approved by VP of Business.

(4) Don't know.

(5) I don't know.

(6) Department head and dean request material and equipment and if funds allow will purchase.

(7) I select all educational tech. for my curriculum. Approval is then sought from my department head, then from VP of Instruction.

(8) Justification, funding.

(9) Requisition to dept. chair to VP of Inst. with budget limits.

(10) Priority needs first, as budget allows.

(11) Each instructor will usually get one request, then budget is exhausted.

(12) I do not know.

(13) Joint decision between dept. head and myself.

Vocational

(1) Faculty makes suggestions and administration makes decisions.

(2) Sometimes individual in department, sometimes committee, sometimes VP of Instruction.

(3) Needs are observed by instructor. The needs re prioritized and then discussed with dept. chair. Different vendors are studied to determine the best item for a particular need, and then a request is entered through the proper channels. Item may or may not be purchased depending on availability of funds.

Question #16: How would you prefer the educational technology selection process to take place?

Department Head

(1) When you need it just order it.

(2) Requests are made to Dean of LRC, if money is available they are then approved by VP of Instruction and ordered.

(3) Not able to comment at this point.

(4) Exactly like it does now.

(5) ?

(6) Known budget for each dept. for software, videos, and known plan to establish video and computer learning labs.

(7) Seems to function well for my department needs.

General Education

(1) I am not sure. I have never had to think about this.

Technical

(1) Through meeting of entire business dept.

(2) Survey.

(3) Don't know.

(4) This method of approval is acceptable; however, I would like to have a fixed budget, that I can count on and a small pool of money that I could spend immediately (with proper approval).

(5) Requisitions to dept. chair to VP of Instruction with budget limits.

(6) Process is OK, but pitfall is the lack of budget.

Vocational

(1) Unsure.

(2) Instructors who teach with particular educational technology.

(3) To me, it seems proper as it is (to insure proper safeguards to the process).

Other Comments:

Department Head

(1) Only obtain overhead projection equipment with difficulty.

(2) I have no problem with the present system. My requests have always been considered.

(3) Computers are inadequate for students, OK for faculty. Need more videos.

Vocational

(1)I am new to faculty. Therefore, my use of much equipment has been limited, but, I see the purposes and infinite teaching possibilities of much equipment.

(2) Not applicable to prisons.

General Education

(1) It is very important that our students become familiar with its use in as many areas as possible. Videotaping provides excellent feedback to oral communications....useful resource for English classes. The media specialist has been extremely helpful..etc.

Technical

(1) Everything depends on financing.

(2) Our equipment situation has been improved with $70K of special foundation grant (Kate B. Reynolds) and much additional equipment donated (used) from area hospitals.

(3) Quality of recorders at SCC makes them too bad to use. I bring equipment from home. Most of the AVS for my curriculum (nursing) are so outdated that I cannot use them. I reviewed them and the material was no longer accurate in most cases. When I ask for new films, I am told that there is no money. We did get a grant this year for CAI and obtained some good programs. This was badly needed since the nursing state boards are scheduled to become computerized with the next few years. I am currently adding this to our curriculum. Computers, space, and computer time are scarce for the fall. We need computer lab for nursing.

Faculty Opinions.

Faculty opinions related to acquisition of selected educational technology items were measured with a five-response Likert-type Scale.

Response Scale:

1 Strongly Agree

2 Agree

3 Undecided

4 Disagree

5 Strongly Disagree

Table 18.

Survey Question Number 17.

Numbers of computers in my department for instruction, class management, and research are adequate.

Value Label	Value	Frequency	Percent
Strongly Agree	1	2	4.9
Agree	2	9	22.0
Undecided	3	5	12.2
Disagree	4	19	46.3
Strongly Disagree	5	5	12.2
Mean Score	3.40		
Standard Deviation	1.19		
F Ratio	0.88		

No two groups are signivicantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Facult; Vocational Faculty; General Education Faculty; and Total Faculty.

Question # 17: Instructors scored a fairly consistent "undecided" (3.40) regarding the adequacy of computers in their department for instruction, class management, and research.

Table 19.

Survey Question Number 18.

There should be an increase in the purchase of computer software for my curriculum within the next 1-3 years.

Value Label	Value	Frequency	Percent
Strongly Agree	1	24	58.5
Agree	2	11	26.8
Undecided	3	5	12.2
Disagree	4		
Strongly Disagree	5		
Mean Score	1.53		
Standard Deviation	0.72		
F Ratio	0.70		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Facult; Vocational Faculty; General Education Faculty; and Total Faculty.

A faculty mean of (1.53) indicated agreement supported an increase in purchase of computer software.

Table 20.

Survey Question Number 19.

There should be an increase in the purchase of video equipment for classroom use in the next 1-3 years.

Value Label	Value	Frequency	Percent
Strongly Agree	1	17	41.5
Agree	2	18	43.9
Undecided	3	3	7.3
Disagree	4	1	2.4
Strongly Disagree	5		
Mean Score	1.70		
Standard Deviation	0.73		
F Ratio	0.34		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Facult; Vocational Faculty; General Education Faculty; and Total Faculty.

Faculty "agreed" (1.56) that video equipment purchases for class room use should increase during the next 1 to 3 years. Scores were relatively consistent throughout the 4 groups.

Table 21.

Survey Question Number 20.

Videotape purchase should be increased in the next 1-3 years.

Value Label	Value	Frequency	Percent
Strongly Agree	1	20	48.8
Agree	2	11	26.8
Undecided	3	9	22.0
Disagree	4	1	2.4
Strongly Disagree	5		
Mean Score	1.73		
Standard Deviation	0.82		
F Ratio	0.38		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Facult; Vocational Faculty; General Education Faculty; and Total Faculty.

Faculty "agreed" (1.73) that videotape purchases should increase.

Table 22.

Survey Question Number 21.

Numbers of overhead projectors should be increased in the next 1-3 years.

Value Label	Value	Frequency	Percent
Strongly Agree	1	5	12.2
Agree	2	14	34.1
Undecided	3	14	34.1
Disagree	4	5	12.2
Strongly Disagree	5	2	4.9
Mean Score	2.63		
Standard Deviation	1.03		
F Ratio	1.85		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Facult; Vocational Faculty; General Education Faculty; and Total Faculty.

Instructors generally "agreed" that the number of overhead projectors should be increased.

Table 23.

Survey Question Number 22.

The cost of video equipment has been a deterrent to their purchase for classrooms use.

Value Label	Value	Frequency	Percent
Strongly Agree	1	11	26.8
Agree	2	16	39.0
Undecided	3	11	26.8
Disagree	4		
Strongly Disagree	5	1	2.4
Mean Score	2.08		
Standard Deviation	0.90		
F Ratio	0.23		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Facult; Vocational Faculty; General Education Faculty; and Total Faculty.

All instructors "agreed" (2.08) that the cost of video equipment has been a deterrent to their purchase for classroom use.

Table 24.

Survey Question Number 23.

The cost of computer software has been a deterrent to their purchase for the college.

Value Label	Value	Frequency	Percent
Strongly Agree	1	9	22.0
Agree	2	18	43.9
Undecided	3	10	24.4
Disagree	4	2	4.9
Strongly Disagree	5		
Mean Score	2.19		
Standard Deviation	0.83		
F Ratio	1.44		

No two groups are significantly different at the .050 level.

Faculty Groupings: Department Heads; Technical Facult; Vocational Faculty; General Education Faculty; and Total Faculty.

Faculty "agreed" (2.19) that cost was a deterrent to purchase of computer software.

Equipment Utilization.

This section consisted of questions directed to availability, use, and requisitions regarding 24 educational technology equipment items.

(1) Availability. Is equipment available? Yes or No.

(2) Use. How often is equipment item used by the instructor? Daily, Weekly, Monthly, or Never.

(3) Request. Has this equipment item been requested for purchase by the instructor? Yes or No.

Many faculty/instructors gave no response to questions. This information has been recorded as a No response throughout this section of the survey. Total responses are indicated on Table 8.

Table 25.

Equipment Utilization by Faculty

Equipment	Availability		Use				Request	
	yes	no	D	W	M	N	yes	no
Television Monitor	35	0	2	13	17	4	17	14
Video Recorder	33	0	1	11	10	7	12	18
Camcorder	21	5	1	1	7	23	9	23
Video Editing	20	4	0	1	9	21	8	21
Apple II Computer	12	8	3	3	3	18	5	20
MacIntosh Computer	3	14	1	2	3	18	5	19
IBM 286*	10	8	6	2	1	11	4	14
IBM 386*	6	8	6	1	1	9	9	9
IBM 486*	2	11	2	0	1	14	9	9
Computer Printer	19	4	13	1	6	5	15	10
CD-ROM	7	6	0	3	5	13	8	12
Multi-Media	10	5	0	2	4	12	6	12
LCD Overhead Projector**	23	3	2	7	11	9	12	14
Computer Network	15	5	6	3	3	12	14	8
Slide Projector	24	2	0	2	8	16	5	19

Equipment	Availability		Use				Request	
	yes	no	D	W	M	N	yes	no
Sound-Filmstrip Projector	24	2	0	5	13	9	4	20
Audio Recorder	21	1	0	1	4	17	7	16
Overhead Projector	32	0	1	10	15	7	6	17
16mm Movie Projector	18	4	0	1	8	17	3	23
Modem	8	7	1	1	4	16	7	13
Satellite System	14	4	0	0	2	22	4	18
Fiber Optics	4	7	2	0	0	20	2	16
Electronic Mail	11	7	11	0	1	11	5	16
Compact Disk Player	7	10	0	1	2	22	4	21

* Denotes IBM or IBM Clone computers
** Denotes Liquid Crystal Display (LCD) Computer Overhead Projection Interface System

Interview Analysis

All six of the community college's administrators were interviewed to contribute responses to this study's four research questions. The interviews were conducted in single sessions lasting from 30 to 40 minutes. An interview form was devised consisting of 12 questions that focused on the four research questions. Although these questions formed a focus for the interviews, the administrators were encouraged to volunteer any information they thought significant to the study.

Separate subsections devoted to general comments and topics of recurring interest to the administrators have been included in this section: (1) general comments, (2) comparison with other community colleges, (3) full-time-equivalents (FTE) and funding, (4) networking, (5) tracking, and (6) trends. Educational technology was defined as any electronic device which helps the faculty, staff, or students learn, teach, store information, generate information, communicate, and manage resources.

Research Question Number One.

What is the relationship between the decision-making process and the user of educational technology? Three additional questions were constructed to help focus on this relationship (1) How do individuals and departments in this college request educational technology? What is your role in

this process? (2) How do you respond to requests for educational technology in your department? (3) How do faculty and staff members formally request educational technology? How are informal requests made?

The community college President began his comments with a dilemma facing North Carolina Community Colleges. "Eighty five percent of what we do is technologically oriented in almost any instructional area. Yet, we have not in the past 8 to 10 years had adequate equipment budgets." In order to make difficult decisions relating to expensive and needed educational technology with limited funding, the community college leadership has advocated a team approach to determine what will be the priorities of the college.

The team approach is a concept that was repeated throughout the administrator interviews. The Dean of Learning Resources contrasted the administrator's role as one of a generalist with the specialist role. Specialists in content areas are often the only people on campus qualified to evaluate, recommend, and justify requests for educational technology equipment in their specific areas.

The Vice President of Instruction, the administrator responsible for generating the college's equipment budget, encourages content experts to share their knowledge and skills for budget development and campus-wide problems. The experience and knowledge of these experts were utilized for

long term planning as well. "We do not make decisions in a vacuum or solely on one person's knowledge or whim."

The college relied on a computer committee to provide information relating to the most expensive segment of educational technology purchases. The computer committee was a standing advisory committee composed of technologically knowledgeable individuals from each department on campus. They functioned as information resources for the Vice President and information conduits back to their departments. They represented their departments in committee meetings. They also helped justify the expense and high prioritization of certain equipment.

Faculty members needed to justify their equipment requests. Department heads, in turn, also needed to justify equipment, especially expensive equipment needs to the Vice President of Instruction. Individual requests needed to "survive the cuts" as they moved from department to total college priority lists. How well needs requests were communicated influenced the effectiveness of justification and eventual rank in the priority list.

New technology was a catalyst for implementing the team approach to decision-making. The Vice President of Instruction acknowledged an active competition for technological benefits.

> If new technologies are not purchased nothing happens. We don't go backwards. We simply do not advance in that area.If we do make a purchase and add a new technology that will enhance classroom presentation, the learning

> environment improves. This gets our faculty/staff seriously thinking about making technological changes for obvious benefits. This creates competition among faculty and departments.

The Vice President went on to describe the "ownership" established by faculty members as they participated in the process of prioritizing equipment needs for their departments. In this process everybody in the department knew and supported the acquisition of each item whether they directly used it or not. "Priorities are acknowledged and everybody buys into it."

The Vice President of Student Services agreed:

> Our new college leadership has advocated a team approach to determine what will be the priorities of the college and the individual departments. "Each department has equal access to the budget process. It is up to the individual instructors to convince their department heads to let their priorities take precedence.

To summarize, the decision-making process began with the user of technology. Users of educational technology were requested to generate lists of equipment that enabled them to meet their educational goals and objectives. The role of the administrator was to request equipment needs lists from departments and decide appropriate allocations for departments.

Research Question Number Two.

How do decision-makers select educational technology at a community college? The following questions were designed

to help administrators focus on this topic: (4) What information do you use to help you better understand and function with educational technology? (5) What concerns do you have with educational technology? Where are the problem area at this community college? (6) What concerns do you have with the selection process regarding educational technology at this community college? (7) What information networks are available to you regarding educational technology matters?

One of the most difficult problems facing community college administrators was staying current on available technology and possible applications. In most instructional areas the community college relied on advisory committees. Each instructional area also benefited from a "Developing A Curriculum" (DACUM) Committee, for improving and revising curricula each five years. Through the DACUM process new technologies and related student technical competencies were discussed and recommended for inclusion into programs. The college president considered this advisory aspect more critical in computer areas where technological change was most evident. The computer committee was a standing committee and affected over half the technology the school dealt with. In the President's words, "If people are up-to-date on computer technology then much of the other technology falls in place." In more narrowly defined areas,

reliance was placed on the people who were responsible for the operation of technical equipment.

The Vice President for Instruction adamantly denied any role in prioritizing equipment for department allocations. "I wasn't hired to know the specifics of 15 or 18 curricula that we have. You don't find anybody that knows that. Therefore, it becomes my responsibility to employ people or promote people who do know their specific areas."

According to the Vice President of Business, the college president and the three Vice Presidents (Instruction, Business, and Student Services) decide how equipment funds will be allocated. These four make up the Executive Council. The Administrative Council, formed of deans, department heads, student government president, two trustees, and members of the Executive Council, generates discussion and information necessary to aid the Executive Council in its deliberations. Members of the Administrative Council, in turn, must rely on individuals in their departments who are knowledgeable in specific technologies. A relationship that fosters information flow, requests, and justifications from the specialist to the department heads and deans of the Administrative Council is crucial to the effectiveness of this process. The Vice President for Business specifies this relationship: "Individuals who have direct responsibility and hands-on operation of the equipment are given a great deal of influence over items

[selected for high prioritization]. They are also held accountable. Yet, it's a combination of many people that help form a total picture of college equipment needs."

Administrators agree that this process is time consuming. Planning is an essential component of the success of this process. Quick responses or adjustments are not expected.

Research Question Number Three

What are the procedures for governing control, allocation, and purchase of educational technology at a community college? Additional questions related to this topic were formed: (8) Describe the decision-making process at SCC regarding the allocation of educational technology. What is your role in this process? (9) How do the procedures governing educational technology at this college differ from that at other colleges? What is unique to this school? (10) Are decisions made through an administrative team approach? If so how are these decisions reached? (11) What procedure do you personally follow to make decisions regarding educational technology? What criteria are significant for these decisions? (12) How is the procedure used at this school sensitive and responsive to the particular needs of this college?

The college president prefaced his description of the process by which the college allocated funds and selected

equipment for instructional purposes with this comment: "If we had plenty of money an informal process would be a possibility. We could afford to purchase all requests, but, with a limited budget we need a process that fairly generates budget requests based on justifiable needs." This resulted in adoption of a formalized process involving almost all staff and faculty to some degree. The process was complicated by a limited budget and involved extensive planning institution-wide. The process involves the following steps:

(1) Each department or area examines its current needs, future needs, and projected goals, with short-term and long-term objectives. Some equipment involving sophisticated technology is necessary in order to reach certain of those objectives.

(2) Equipment requests are generated throughout the institution by each department. In the spring of each year, the three vice presidents direct department heads and deans to develop a list of equipment needs. The department heads and deans in turn approach their staff and faculty regarding equipment needs for individual programs. Equipment requests are broken down into computer or noncomputer items. All computer-related items are reviewed by the computer (advisory) committee, which insures that computer related purchases do not result in incompatible or mismatched equipment. The committee members, said the President, "look

for consistency with equipment that we currently have, the need to replace equipment that we currently have, whether we can upgrade, whether we have to replace, whether we can add memory, or what we need to do in order to meet the goals the equipment is requested to meet." Noncomputer items move directly to the Administrative Council. As with computer equipment requests, discussions consider whether noncomputer equipment requests are consistent with the goals and objectives of the institution and are compatible with equipment already in use.

(3) Prioritization of requests involves all the faculty and staff. As requests are generated and travel up through two or three levels of hierarchy within the institution, they are discussed at each level, beginning with input from each department member. They are prioritized and requirements for equipment are generated from each of the primary areas of the college: business office, instructional departments, and student development.

(4) Allocation of funds is determined by the Executive Committee composed of the president and three vice presidents, who are advised on many equipment matters the Administrative Council. All requests are eventually merged by the Executive Committee to form one budget in which priorities for equipment for the entire institution are set and understood by those people who are in the primary decision-making roles of the institution.

(5) This allocation process sers August as a deadline for a final institutional budget. At this time the budget is submitted to the North Carolina Department for Community Colleges. Because of state rules and regulations, money is made available on a quarterly basis. Top priority equipment is purchased in the first quarter.

(6) The budget reflects the current goals and objectives of short-term and long-term institutional planning. The President reflected on budget strategy.

> This past year, 1991-1992, the budget reflected an institutional priority, more library books. $11,000 in equipment funds were transferred to the book fund because our book budget is worse than our equipment budget. It is entirely possible this transfer will happen again. We will probably maintain a reserve out of that equipment this year, in case we get some funds for building the new Learning Resources Center or the new classroom building. it will be possible to reserve funds (you can carry over equipment budget funds) for equipment needed for a new structure...We would reserve some $40,000 or more of this year's funds to help us equip a new building. If requesting departments can show (justify) equipment appropriate for the new building can be utilized now, they would be purchased with current funds.

The Vice President of Instruction has the responsibility for developing the majority of the equipment budget for the college. He confirmed that the process begins in the spring of the year when deans and department heads develop their requests for equipment. Each department prioritizes an equipment list which is submitted to him by June. While not part of the prioritizing process, the vice

president pares down departmental requests to available allocations. In his words:

> What I tried to do...was to consider institutional priorities established by the trustees, the President, and the Department of Community Colleges. Revised budget allocations are given to department heads as allocations are fine tuned. Department heads have a final opportunity to finalize their priority lists. Therefore, I reduce request in my budget that I put together for the President, which goes to his office. One morning in the summer the President and Vice Presidents sit down and discuss how we will divvy up the equipment budget. Instruction get 75% of it.

Long term planning factors into equipment requests. Planning actually formed the foundation for yearly requests and provided a consistent basis should funding sources be inconsistent. Instructional priorities reflect long term planning. The Vice President of Instruction reflected:

> This year a high priority has been upgrading our science labs for our new transfer program. This priority superceds normal departmental equipment needs. However, next year our main institutional needs will be directed away from the science labs. All department heads, and most faculty, are aware of this as they participate in the process.

The Vice President for Business stressed the scrutiny given each equipment request at the departmental level and from the appropriate Vice President. The main function of the Vice President of Business is to facilitate purchase of equipment items approved by the Executive Council. He insures that all purchasing conforms with state guidelines and legalities. If the item is on state contract there is little problem with insuring a purchase order providing the funds have been set aside for it. If price is more than

previously indicated, business personnel will go back to that vice president for additional funds. This may necessitate a restructuring of priorities within that department if a large discrepancy is involved. This prioritizing and reprioritizing are made outside the business office. The Vice President of Business stated:

> Our functions are to (1) make sure we have adequate funds to pay for the equipment before we encumber and (2) once we receive the item we tag it and we inventory it. Once the equipment is here it is assigned to a department or program. We do an internal control or internal audit on an annual basis.

The Vice President of Business also stressed the formality of the process. "There are no informal requests, only special requests based on a special, unique need such as needs of new handicapped students." He believes this system is a good one and sees no need to make any changes in the process.

The Vice President of Student Development compared the equipment budget process to a family budget. "You evaluate it based on need and usefulness." Priorities can change with new technologies. Technological advances as relatively inexpensive as new software can make available new possibilities for student services. The process is sensitive to change and opportunities. "It's a flexible plan that is based on new knowledge that we gain."

The Dean of Continuing Education considers the equipment budget process effective.

> I think that it is a good honest effort on everybody's part. But I think it needs more direction. We need a plan, a strategic plan...a plan that could get everybody to buy into as how we are going to select the equipment and training for the individuals.

This dean sees the need for more organization. While the Continuing Education Department has an equipment request process similar to the rest of the institution, the dean thinks the entire school should mimic larger schools. He believes "a big problem is lack of validation and research on equipment items. We need a more organized approach utilizing a more thought-out plan that fits into the big scheme of the whole college." This dean deals with local businesses and industries and thus is well versed in "Back to Industry" and "Focus on Industry" (FIT) programs. His model for strategic planning is based on his involvement as chair of the county Emergency Medical Services Council. This organization is presently organizing a retreat in which facilitator and consultants will help the council develop a strategic emergency plan for the county. He believes in the value of a longer-range plan than is presently in place at this community college.

The Dean of Learning Resources described a "needs-orientation" process to facilitate decision making in "lean years" of reduced funding. This needs-orientation helps decide specific allocations for different departments. "That's where we use the student need versus the professional need. Institutionally, our student needs-

orientation clearly identifies priorities. This is very much a collaborative process." This dean went on to explain that the college Vice Presidents have a crucial position in this process. "It is up to the vice presidents to be credible in their approach and in their explanation of the equipment needed." An added responsibility for all administrators is to fully explain why a faculty or staff member's equipment request is not accepted for allocation.

Additional Questions.

(1) How does the process at this school differ from that of other community colleges? The Vice President of Instruction thought that allocation processes among colleges were similar. He had worked in four community colleges in the state and in each, departments developed a separate and distinctive list of priorities. Then department heads and administrators met for a give-and-take discussion session to determine allocations. Other schools also benefited from advisory committees such as this college's computer committee.

The Vice President of Business commented that "there is a large variance in technology depending on the size of the institution." The Vice President of Student Development agreed with this comment stating that all of the technology used had been first developed and tested at larger schools

first. Size of institutions and number of people was a resource for utilization of technology.

(2) How does Full Time Equivalent (FTE) funding affect allocations? The President thought that allocations were fair to an extent.

> To be really fair we must have more equipment. While we are spending most money keeping students in science and computer classes, we could easily use computers in composition, and should. The question becomes; what is the priority of having English on computers versus upgrading computers that a person is going to have to go out and repair and troubleshoot.

The Vice President of Instruction considered total utilization when establishing priorities. "Programs with few students that need expensive equipment are not likely to get those items until we wait for a year with ample funding. The program does not generate enough FTE to justify such an expenditure."

Comments.

The President expressed the problem of the need for technical equipment outdistancing the available funding. "We must rely on grants, both public and private, to supplement our equipment requests." Borrowing equipment and accepting donated medical and industrial equipment that is adequate for teaching purposes but not for commercial production is a widely accepted practice. These gifts and grants, however, target specific programs and do not help alleviate general instructional need. "We are doing a good

job utilizing technology. We are taking as good advantage of funding as we can." A challenge facing community colleges is to provide the very best equipment possible to insure the best possible training for students. It is the responsibility of instructors as well as administrators to be knowledgeable as to what those skills and equipment needs will be.

The Vice President of Instruction outlined a Darwinian process of instructional equipment allocations. He stated:

> Part of your job is to fight for everything your department needs and get everything you can for that job. If you didn't do that we wouldn't think you were doing your job very well. There is to a degree, conflict built into the system. We want everybody to do their job, which includes slugging it out for funding. A natural adversarial role exists to an extent.

However, for this process to work fairly, every instructor and staff member must understand the process. One critical aspect of this system was how this understanding was communicated. The competitive aspects of this process have not been formally articulated to the staff and faculty of the college. Those who have discovered the true competitive nature of this process have a distinct advantage over those who are functioning on a more naive basis.

The Vice President of Student Services believes the college needs to stress new technologies for computerized student placement, registration, and career services. These technologies are already in place in larger community

colleges. Many are becoming affordable, and the savings in human resources demand their implementation. One advantage of delaying purchase of technologies was realized as larger schools established a track record for specific brands of hardware and software. By the time a smaller college seriously considered implementing these technologies, accurate evaluative studies had been prepared by larger, better funded institutions. At the moment, however, the comparison of technological sophistication in small to large community colleges is described by the Vice President of Student Services as a comparison "between dinosaurs and astronauts."

The Dean of Continuing Education stressed utilization of more technology in instructional settings. "The fact that we can take advantage of all the senses in the learning process makes the difference. Teachers and instructors need to take on the role of facilitator of the educational process as opposed to the dictator of the educational process." This dean, who has a business and industrial learning and training orientation, was attempting to offer the same instructional methodology evident in today's industrial learning environments. "We spend a lot of money on books, many of which collect dust. We must make information more accessible to our customers so they can extract information at a high rate of speed." This dean sees the need for a mobile instructional unit that can be

located at any industrial site for Adult Basic Education, industrial training and safety classes, or management seminars. He also perceives a need to coordinate more closely the community college activities targeting local business and industry. "We get a lot of feedback from industry. Unfortunately, we are not always able to meet the demands of industry. This is due for the most part to insufficient funding."

The Dean of Learning Resources identifies the major areas of need as students and professionals. Students always come first, but, at some point instructors must consider "what hardware, software, or improvement in equipment will make our jobs easier and more efficient." She explained that one advantage to being a small community college is the fact that the executive council discusses, shares, and understands the needs of each department. Everybody was part of the allocation process. Many people were involved in each and every purchase.

Networking.

The President placed great value in obtaining information, both formally and informally. As president he has access to minds, ideas, innovations, and new technology at other institutions.

> But you have to be aware and be listening for the important things. You need to listen for the implications of instruction at the institution and indirect applications to the operations. Different

> people are more attuned to technology and better understand or respond due to personal interest. If I don't understand something that I have seen, I will ask questions about potential implications to this college. Reviewing new technologies with an instructor/staff member on campus can give us an insight as to what is currently going on and have some long range implications and long term planning.

The Vice President of Student Services described a circle of long-term friends and colleagues that she called for information. Regional meetings are helpful places to find out what other schools are doing and what is happening in Raleigh. She added that The Southern Association of Colleges and Schools (SACS) accreditation committees are very valuable sources of information regarding new programs. She included sources of information as "my peers, cohorts, reading, attending meetings, and contacts, usually at the larger schools that get the technology first."

The Vice President of Business responded to the question regarding networking in computer terms. This community college recently implemented a Local Area computer Network (LAN), which effectively linked personal computers across campus with a file server to form a main frame computer. An added benefit was to control copyright and licensing problems.

The Dean of Continuing Education prefered a more formalized network of information sharing. "Certainly this is an opportunity for us to excel and get more organized."

Trends.

The Vice President of Student Services remarked: "I think we are seeing a new breed of leadership, not just here but across the state. The new leaders are becoming more instructional leaders, sharing the decision-making process and receiving input from all areas, realizing a bottom-up structure." She reflected that this change within a college takes time. It also requires many meetings, one-on-one interactions, and effective committees to encourage collegial discourse. This new leadership style requires a lot of participation from a lot of people. People must be willing, encouraged, and expected to buy into the process.

The Vice President of Business said "Caution is good." In times of budget cut-backs, conservative purchasing is necessary when considering new technologies. "We take our time and begin to look well ahead of time for major equipment systems. We must consider repair, training, and replacement costs." He advocates providing information to his staff in an effort to let them "buy into" new innovative programs thus maximizing efficiency of costly equipment.

The Dean of Learning Resources shares a similar opinion regarding experience. "Experienced community college professionals help determine what is a fad and what is a trend. Experience helps recognize the difference." Lack of funding prevents the purchase of trendy equipment items.

Tracking.

A problem existed in tracking the progress of requisitioned equipment items through the allocation-purchase process. Tracking a single item through the allocation process would be very difficult due to the long time frame and the layered structure of the process. Once funding for the equipment has been allocated, each item follows a "paper trail" procedure complete with signatures from a (1) department head, (2) vice president, and (3) business office representative. At that point a purchase order is issued and the equipment is ordered from a vendor. As previously stated, procedures followed different avenues according to item cost and availability on state contract.

Few faculty members demonstrated knowledge of this procedure. The Dean of Learning Resources identified the procedure as one which needed to be explained to all staff and faculty members. This was an area vital to the allocation process, explained the roles and responsibilities of many college personnel, and provided closure to an important team activity.

Analysis

Documents.

Job descriptions clearly underscored individual roles and responsibilities regarding the administration of funds, budgeting, equipment selection, purchase orders, inventory, loan services, and shipping and receiving of educational technology at a community college. The purpose of advisory committees in facilitating acquisition of information and input of a cross-section of the college community was also clearly defined. The specific process by which decision making takes place was not articulated in any written document.

Utilizing elements of individual job descriptions, an ideal process was devised to illustrate the bureaucratic procedure by which educational technology is allocated. Another schematic based on descriptive elements of committee influence on the allocations process was also developed. The two schematics portray a more complicated and dynamic process through which group activities interact with individual roles and responsibilities.

Equipment available to faculty members through the Learning Resources Center totaled 90 pieces. Only 27 of these items satisfied 88% of faculty requests. Faculty equipment loan preference focused on classroom use of videotapes and overhead projection. These were items that

many faculty members use each week and in some cases each day. The peak use was in January through April, or winter quarter. A secondary peak time was fall quarter from September through December.

Equipment funding comes primarily from the state. Total equipment funding for 1992 was less than half of the 1991 budget. The substantial increase in the 1991 budget reflects a sizable federal grant and expenditure of local funds for support items not defined as educational technology, yet, the total budget for items termed educational technology was very close for the two years. The total educational technology expenditures for 1990-1991 was $91,425.05 compared to $94,539.30 for 1991-1992. An administrative decision to upgrade the computer resources on campus affected both years.

Survey.

A utilization survey completed by 95% of the full-time faculty indicated information regarding faculty attitudes, opinions, and utilization patterns. Faculty members agreed that "usually" their requests were satisfactorily handled by administrators who effectively selected appropriate educational technology equipment within budget limitations. However, they only "occasionally" felt included in the selection process, understood the process, or had input into the process. They "usually" felt comfortable with new

technologies and their technical skill levels, contributed to the knowledge base of their departments, and actively sought and knew where to find reliable information regarding educational technologies in their fields.

Faculty members demonstrated a wide variety of operational understandings of the allocations process utilized by the community college. Out of 27 responses to the question, 12 (44%) faculty members demonstrated awareness of the process by describing the roles of themselves, their department heads, and the vice presidents. They also described the process as an interaction, or prioritization procedure.

Twelve faculty members (44%) responded with uncertain or incomplete responses, demonstrating some deficiency or break in continuity of the process. Three faculty members (12%) identified themselves as either new to the system or otherwise unfamiliar with the process. They volunteered no specific information.

Department heads indicated no greater knowledge of the process than did faculty members in general. Technical faculty did demonstrate a more complete understanding of the process while General Education faculty demonstrated a more incomplete understanding. Sixty nine percent of the total faculty responded to this question.

The majority of faculty members did not demonstrate understanding of the process by which decisions were made

regarding the selection and purchase of educational technology. Only 8 out of a total of 27 of faculty responses indicated an inaccurate description of the process. An accurate description included mention of (1) departmental requests, meetings, or prioritization, (2) justification of requests, and (3) approval of allocations by vice presidents. Thirteen faculty members indicated an uncertain or incomplete understanding of the process while six indicated they knew nothing about the process. Three out of seven department heads demonstrated understanding of the decision-making process as previously defined. Sixty nine percent of the total faculty responded to this question.

Response rates for all faculty members were low (43.5%) concerning suggestions for improving the allocations process whick included a more definite budget and better evaluation of equipment (29.4%); more participation (5.8%); and complete funding (5.8%). Several faculty members (29.4%) liked the process as it was, while 29.4% either made no comment or wanted to give the matter further consideration. Fourty-three percent of department heads preferred a process similar to the one in operation.

The faculty volunteered further comments: equipment was available with difficulty; computers were inadequate for students; the school needed more videos; the process was budget driven; and much of the equipment was old. Much

equipment was inappropriate for some curricula. Generally, the faculty saw room for improvement in budget and funding matters. They had few negative comments regarding services.

Faculty opinions were in agreement over such matters as the need for more computers for instruction; increase in purchase of computer software, video equipment, videotapes for classroom use, and overhead projectors. The faculty also agreed that the high cost of video equipment and computer software had been a deterrent to their desired purchases for the college.

Interviews.

Each of the administrators described an effective allocations process that stressed teamwork, even while their individual roles were clearly defined and distinct. The allocations process, a product of insufficient funding, was designed to maximize input from each department, advisory committees, and area specialists.

Competition for funding provided motivation for department heads to articulate the plans and equipment requests of their respective departments. Through interaction, compromise, and consensus the process was thought to provide an upward flow of information which flowed ultimately to the Executive Council, which determined allocations.

The process was time consuming but all administrators agreed it was effective. Although one administrator wanted more strategic planning, the general consensus indicated it was a satisfactory process.

Research Questions.

1) What is the relationship between the decision making process and the user of educational technology?

Users of educational technology at this community college have the opportunity to express their equipment needs through a formalized process of funding allocation. This process begins at the department level and proceeds upward through the hierarchial structure to the Executive Council comprised of the college president and vice presidents which determines departmental equipment allocations.

This crucial process was not spelled out in any written materials to staff and faculty members, even though it was uniformly understood and articulated verbally by all of the administrators and many department heads. Moreover, the faculty members could offer varied explanations of how the process worked and their roles in the process. The verbalization of this process was an important component of the administrative culture of the college. Similar equipment allocations existed at other community colleges. This tendency for uniformity of process enabled

administrators and experienced faculty members to negotiate their roles successfully should they transfer within one college or into another college culture.

Committees have influence on educational technology decision making. Five committees affect the technological environment of this community college. The impact of these groups on the decision-making process was acknowledged in the Staff-Faculty Handbook but not related to individual roles and responsibilities. Thus, individual roles in this process may change as committee membership changes. The advisory function of four of these committees may easily over-ride legitimate needs of individuals or departments. The political implications for unfairness in the allocations process are evidently countered by a genuine drive for consensus by the college leadership.

A structural hierarchy of the college can be organized with a three-tiered system. Level I is made up of staff and faculty members. Level II is composed of middle managers or department heads and deans. Level III is make up of the president and the vice presidents. The equipment allocations process was formalized and worked well at the top two levels, Level II and Level III. However, according to the faculty survey, the process was not clearly articulated to Level I membership. Individuals in this group did not perceive the process nor their roles within the process with any consistency.

Administrators acknowledged the participation of Level I members to be crucial to the process. Consensus was key to the success of this system, according to the college leadership, yet no formal or written effort has been made to explain the system to Level I members.

2) How do decision makers select educational technology at a community college?

A formal process has been established to select educational technology at this community college. Staff and faculty submit requests to their department chairs who in turn submit prioritized equipment lists to their vice presidents. Ideally, the prioritizing process involves each member of each department. However, in reality the majority of faculty members did not report an awareness of this process.

It was possible for both individuals and committees to have direct influence on the four members of the Executive Council, the body that eventually determines equipment allocations. An individual faculty member could take a request directly to the Vice President of Instruction whether or not the request had been approved by the department head. This vice president was also chair of the computer committee which advised regarding all computer equipment programs. Computer-related equipment accounted for over half of all equipment expenditures. The Learning

Resources Committee advised the Dean of Learning Resources who reported directly to the Vice President of Instruction. The President and all three Vice Presidents were advised by both the Institutional Effectiveness and Planning Committee and the Advisory Council. Between these two organizations many items regarding college missions and strategic planning were discussed and recommended for implementation.

Decision makers requested equipment lists and justification for each item on those lists. Formalized justification became more important when administrators did not fully understand the technologies under consideration. Specialists were required to make accurate and persuasive justification for technologies unknown to administrative decision makers. New faculty members with no acculturation to "unwritten" equipment allocation processes were at a disadvantage in the competition for finite funds.

According to the formalized process articulated by administrators and inferred in the Staff and Faculty Handbook, administrators selected very little educational technology. Clearly, departments developed their equipment lists and submitted them for review by the Executive Council. Administrators at this level finalized allocation budgets that resulted in eliminatin of low-priority items on equipment lists. Although administrators did have control over allocations and selection of broad directions for technical growth, they did not select individual equipment

items except for their respective offices or departments. The perception among the faculty was not the same. Only 44% of the total faculty adequately comprehended the allocations process, while 30% understood the decision-making process as identified by the administrators.

3) What are the procedures for governing control, allocation, and purchase of educational technology at a community college?

The procedures that govern control, allocation, and purchase of educational technology at the community college in the study were formalized because of inadequate funding from the state, federal, and local levels. Procedures had been developed to ensure fairness to departments and areas competing for scarce resources.

The process began with a request from vice presidents for their deans and department heads to develop prioritized equipment lists for purchase for the next fiscal year. Deans and department heads in turn asked their staff and faculty members to submit individual requests for educational technology. The deans and department heads were required to then develop a list with the input of all of their subordinates, thus building consensus within the department. Prioritization only occurred at the department level. No upper-level administrators took part in

determining importance of equipment for individual departments.

The Vice President for Instruction pared down requests with projected available funds. He benefitted from the advice of the Computer Committee, Learning Resources Committee, Advisory Council, and the Institutional Effectiveness and Planning Committee. The Executive Council discussed many equipment items in the framework of the college mission and strategic planning. The President of the College and the Vice President of Instruction then allocated funds for each department for equipment purchases. Department heads and deans were then given an opportunity to make any changes in their equipment requests lists. This step assumed that the final departmental allocation was less than the total equipment costs included in the requests.

The Vice President for Business had the responsibility of the mechanics and legality of purchasing equipment items. He had to conform with state law and regulations. He notified the Vice President of Instruction when any problems arose concerning price discrepancy.

All of the college administrators and the majority of deans and department heads indicated they were satisfied with the allocation system. The process was designed to function well with limited funding. Any problems or misunderstanding occurred at the staff and faculty level of the organization. No complete or formal explanation of the

process existed in written form. New members to the organization had to learn the process by word of mouth from experienced members of the organization or through meetings with mid or upper level administrators. Knowledge of this process was obtained informally as they learned the culture of the organization. In this regard, the process was inadequate, and if one objective of this process was to encourage consensus and participative decision-making, the objective was not realized.

4) What educational technology do faculty use and need at a community college?

The overwhelming majority of educational technology equipment loaned to faculty members through the Learning Resources Center (LRC) for the past year were television/VCRs and overhead transparency projectors. These two categories accounted for 88% of all equipment check-outs. The number of television/VCR and overhead projection equipment items was only 43% of the total equipment available through the LRC.

In fiscal year 1990-91, 89% of state educational technology equipment allocations were spent on computer-related items. Only 1.7% of total educational technology equipment allocations were spent on television/VCRs and overhead projection equipment. In fiscal year 1991-92, 81% of state allocations went to computer-related items while

2.8% went to television/VCR and overhead projection equipment.

In the faculty survey, 82 percent of instructors used televisions at least monthly; 31 percent used televisions at least weekly. Only 56% of the faculty reported using videotape recorders (VCRs). However, the Learning Resources Center rarely checked out a television without a VCR attached. The faculty failed to distinguish the role of videotape in utilizing televisions.

Although the college has spent a large percentage of equipment allocation funds on computers, a relatively small percentage of faculty members indicated utilization. Twenty three percent of the faculty indicated use of Apple II Computers. Among those who used IBM computers, 23% indicated use of a 286, 20% indicated use of a 386, and 8% indicated use of a 486. Added together, this accounted for half of the faculty. Sixty four percent of the total faculty responded "no" to availability of 386 computers, yet by the end of fiscal year 1991-92, three quarters of the full-time faculty members had a 386 computer in their offices. However, 51% of the faculty reported using a computer printer at least monthly; only 33% reported using a printer daily. One supposition is that the faculty members do not know what kind of computer they are using.

By the summer of 1992, a local area computer network (LAN) had been established for the community college in two

of the buildings on campus. The majority (64%) of instructors' computers were connected to the LAN. Nevertheless, only 31% of faculty indicated they used a computer network at any time.

Fourty-six percent of the total faculty indicated use of sound/filmstrip projectors. However, only 46 checkouts of sound/filmstrip projectors were recorded by the Learning Resources Center and no departments owned such equipment.

Thirty percent of the total faculty responded favorably to use of electronic mail (E-mail), which has been available to staff and faculty for over two years. E-mail transmissions are received through the "Prime" computer system which is linked to all 58 community colleges throughout the state. Messages from the school's Prime printer are placed in faculty mailboxes; in addition, staff and faculty members have access to the Prime computer through the college business office. However, in general, faculty members did not indicate competent knowledge of computers and availability of educational technology at the college.

Summary

The decision-making process related to the control, allocation, use, and purchase of educational technology at the target community college has been formalized and became

part of the school's culture. The roles and responsibilities of individuals were clearly defined. However, the processes by which individuals and departments requested equipment and then administrators determined budget allocations were not written down. These processes must be learned by exposure to the culture of the institution.

The advisory role of committees added complexity to the process. Committees also provided additional sources of information and were instruments for discussion and debate regarding the value of new technologies. Committees provided a place where unwritten elements of the institution's culture could be assimilated.

Length of exposure to the culture was the key to knowledge of decision-making and allocations processes. New employees demonstrated the least accurate knowledge of allocations and decision-making processes utilized by the college. The faculty, as a group, was satisfied with the allocations process and generally perceived the administrators as effective in providing technological needs. However, faculty members did not feel that they were part of the allocation or decision-making process, which they perceived incompletely. They had not had the benefit of long time "acculturation" and input from advisory committees.

Faculty members at this community college demonstrated a wide range of knowledge regarding educational technology equipment. Technical instructors displayed more depth and accuracy in their knowledge of equipment than did their general education counterparts. Many instructors realized neither the availability nor the capability of equipment.

The administrators perceived the allocations process as a team-building exercise. They encouraged participation at the departmental level and delegated authority to department heads to generate prioritized equipment requests. Administrators expected individuals and departments to be aggressive in pursuing their requests. Competition within the college for insufficient funds encouraged all staff and faculty members to actively identify technologies important to their areas and to justify their need.

The allocations process was acknowledged by both administrators and faculty to be effective. If a problem existed with this process, it was at the individual level with people who did not understand the process nor take advantage of opportunities the process offers. The process was not written down and had to be learned through exposure to committees and time spent with colleagues. The process worked well when it was understood uniformly but created problems for individuals not well versed in the informal language of the school's culture.

CHAPTER V

DISCUSSION AND CONCLUSIONS

This study was designed to investigate the relationship between the decision-making process and the utilization of educational technology equipment at a community college. To accomplish this, a triangulated methodology was designed to answer four research questions. (1) What is the relationship between the decision making process and the user of educational technology? (2) How do decision makers select educational technology at a community college? (3) What are the procedures for governing control, allocation, and purchase of educational technology at a community college? (4) What educational technology do faculty use and need at a community college?

An in-depth understanding of the relationship of the decision-making process and the user of technology at a single college has been the goal of this study, rather than sweeping generalizations of significance to large populations. Therefore, a qualitative case study format was selected.

The findings of this study have been documented and reported in detail earlier in this paper. These final remarks are intended to discuss the meaning and significance of the results of the study in a framework of the relevant literature discussed in Chapter II of this study. This

discussion will be organized around the four research questions. A section dealing with the implications of the results of this study will be followed with recommendations for further study.

Discussion

At the heart of this investigation were three assumptions described by the College President:
(1) Funding, at this time, is not adequate for comprehensive community colleges to complete their missions.
(2) A lack of funding requires a formalized allocation process to generate budget requests.
(3) Short-term, strategic, and departmental planning in addition to wide-spread participation are necessary to generate budget requests.

The comprehensive mission of this community college remains intact despite under-funding. This school has, through necessity, explored innovative means of creating outcomes that maximize the values of the leadership and goals of the institution (Birnbaum, 1985). For example, the college cultivated a horizontal focus or relationship with local businesses and industries to stimulate flow of higher technology into the domain of the college (Cross, 1985). Creative methods of equipment funding and procurement have

been a reflection of autonomy and innovations generally attributed to community colleges (Monroe, 1974).

The open door policy of this community college is still viable despite external and financial pressures. Effective leadership has been identified as a trait of the college. The decision-making and allocations processes identified in this study focus on effective leadership and team building as innovative means of adapting and evolving during the turbulent transformations sweeping our society (Naisbitt, 1982).

What is the relationship between the decision making process and the user of educational technology?

The user of educational technology and the college decision makers had different perceptions of the decision-making process. While the college administrators were in agreement as to the mechanics of the process, the majority of faculty members did not demonstrate a common understanding. The faculty members indicated a broad variation in their concept of the decision-making and allocations processes, but, the college administration had adopted Perelman's (1987) suggestion for a systematic approach to technological transformation.

The college leadership encouraged formalized participation through the department level to generate equipment requests. The leadership believed this to be a

team-building process, which would suggest a decentralization (Peter & Austin, 1984) of authority. The college administrators did adhere to defined roles, yet the majority of faculty members did not perceive clearly defined roles for themselves in this process.

Faculty and staff members were expected to compete for scarce resources through effective and persuasive explanation of their equipment needs and justification of the resultant expense. However, at no place in the college literature was this fact communicated to new employees. Long-term employees did understand the process. The heuristic paradigm of Perelman (1987) was exemplified through this inequity. Discovery of knowledge of the allocation process by individuals, a heuristic paradigm, was in evidence throughout this process rather than aggressive action of a leader to instruct or inform as in the agogic paradigm.

The users of educational technology indicated a preference for videotape utilization and overhead projection, yet the college administration decided to invest a vast majority of resources to up-grade and increase computer hardware and software. A decision by the Executive Committee determined the course of technological development for the college that outdistanced the vision of technology held by most faculty members. Apparently, the college

leadership also adopted Perelman's (1987) educational orientation to telecommunications and computers.

The response to this research question indicated a much more uniform and higher awareness by administrators of technological diffusion. The college's decision-making process reflected Levine's (1980) diffusion process in which recognition of need, planning for a solution, implementation, and institutionalization are incorporated into a process for generating needs requests, plans, and justifications upward through the organization. Analysis, assessment, and justification at the staff and faculty level were encouraged as departments developed collective allocation requests. This portion of the process was necessary for administrators to form judgements that affected individual educational programs (Kirk & Gustafson, 1986).

How do decision makers select educational technology at a community college?

Decision making regarding educational technology was a formal process which followed a time line beginning in the spring of the year with a request for equipment needs lists and ending in August with equipment allocations for each department. Decisions regarding educational technology were separated into two arenas, prioritization and allocations.

Decisions related to prioritization were made by department heads in consultation with each department member. This was a participatory component considered by the college administrators to be essential to a process intended to select the most effective and appropriate equipment to meet educational objectives. Decisions regarding equipment budget allocations considered overall college mission, strategic planning, and budget fluxuations. The delegation of authority, while a cornerstone of team building, was a secondary consideration when determining allocations. Maintaining an efficient and accountable management process (Tillery & Deegan, 1985) was a major consideration.

What are the procedures for governing control, allocation, and purchase of educational technology at a community college?

The control of educational technology was exercised through two separate systems the allocations process in purchasing and the Learning Resources Center for equipment loan. Control points in the ideal allocations schematic rested with the Vice Presidents for Instruction and Business. These two positions had authority to approve or disapprove equipment requests and purchases. Department heads had limited control. They could be bypassed by determined faculty members who directly approached the Vice President for Instruction.

In the real allocations schematic, committees complicated the process. According to Bess (1988), complexity determined the amount of authority delegated across organizational settings. All equipment requests involving computers or computer-related equipment were reviewed by the computer committee. This advisory committee reported directly to the Vice President of Instruction as did the Learning Resources Center (LRC) Committee. Many individuals in department-level positions served on both the Institutional Effectiveness Committee and the Advisory Council. These organizations functioned to provide the Executive Committee with information. In the real process schematic a select group of individuals provided input into both departmental prioritization and allocations decisions.

The Executive Council formed the central authority (Bess, 1988) that determined the significance or importance of a problem based on the current environment. The organization's power was exerted through a structural power base using political or persuasive techniques. This mechanism for demonstrating authority and influence is defined by Bacharach & Lawler (1980) and follows a bureaucratic model.

What educational technology do faculty use and need at a community college?

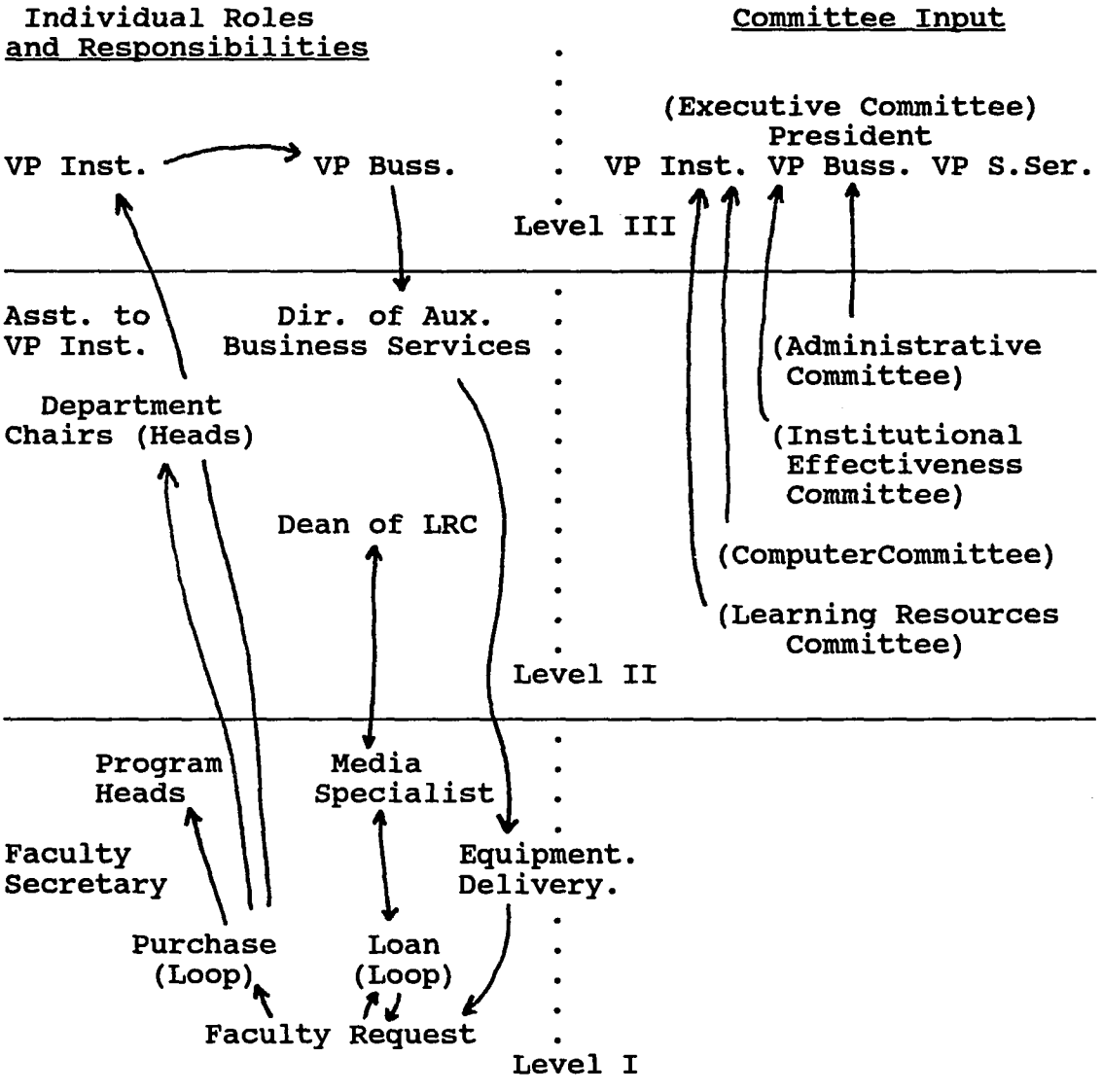
The assessment of all educational technology requested, obtained, utilized, and needed by the faculty was one essential component of this study. The equipment utilization portion of the faculty survey was compared with equipment loan requests from the Learning Resources Center. A user profile was developed composed of subsets. The Technical Curriculum faculty members were extremely knowledgeable in function, utilization, and availability of educational technology. They were also well versed in the allocation and decision-making processes. Individual faculty members in other curricula were also knowledgeable in these areas. In Vocational and General Education curricula, however, a wide variation of general knowledge and perceptions regarding educational technology was identified.

Faculty members as a group did not demonstrate a comprehensive knowledge of equipment available to them. The nature and quality of information and the environment of the college as perceived by faculty members resulted in the existence of many alternative views of college management (Bess, 1988). There is a probable relationship between the lack of accurate information regarding existing educational technology availability on campus and the alternative views toward the decision-making process held by faculty members.

Comprehensive community college faculty members have curriculum-specific interests which are reflected by their use of educational technology. The utilization survey required three responses to 24 equipment items. The large number of "no response" answers on the survey reflected the narrow interest of individual faculty members. Although all faculty members reported that they "usually" felt comfortable with new technologies, they demonstrated a wide variation in their knowledge and use of equipment.

Figure 3.

The "Real" Decision-Making/Allocations Process Schematic



Abbreviations: (1) VP Inst., Vice President for Instruction; (2) VP Buss., Vice President for Business; (3) VP S.Ser., Vice President for Student Services; (4) Asst. to VP Inst., Assistant to the Vice President for Instruction; (5) Dir. of Aux. Business Services, Director of Auxiliary Business Services; and (6) Dean of LRC, Dean of Learning Resources Center.

The Real Decision-Making and Allocations Process.

The "real" decision-making and allocations process identified at the community college has been expressed using two schematics developed for the "ideal" allocations process in Chapter IV of this study. The first of these two ideal schematics illustrates the path taken by an educational technology request generated by a faculty member. This schematic focuses on the roles and responsibilities of the individuals in bureaucratic positions which directly affect reqests. A second "ideal" schematic focusing on advisory committee influence serves to influence request allocations. This one is merged with the first schematic to form the "real" allocations process (See Figure 9).

The two schematics are matched at corresponding bureaucratic levels. The Executive Committee of the committee input schematic, composed of the college president and three vice presidents, corresponds to the Vice President for Instruction and Vice President for Business on the individual roles and responsibilities schematic. This level is termed Level III. The traditional and influential hierarchial nature of Level III is based on the legitimate power attributed to college presidents and vice presidents. Formal decisions made at this level are based on information derived in part from information flowing upward from the lower levels. Informal information flows horizontally

through more candid conversations with committee members and specialists in addition to personal informational networks.

Level II provides reliable information for the Level III decision makers. In the first ideal schematic, department heads generate equipment needs lists at the request of vice presidents. Four advisory committees function at this level to provide information to one or more vice presidents. Committee members are appointed across interdisciplinary lines to insure informational input from each area of the college. While these are formal functions, an informal and competitive interplay of ideas and interest keeps individual and committee discussions dynamic. The motivating force in this situation is competition for scarce resources.

Requests for educational technology are generated by individual staff and faculty members at Level I. Equipment requests that are necessary to successfully attain immediate and two-year planning objectives are submitted to either program heads, department heads, or the Vice President for Instruction. Individuals in specialist positions have opportunities to offer pursuasive justification on behalf of their requests.

Decision-Making Model.

Characteristic elements of decision-making and allocations processes have been identified in Figure 10. Each characteristic has been linked to a management model previously discussed. Decision-making characteristics identified at the community college suggest that this school followed an established political model of decision-making as mentioned in Chapter II.

The political model has elements of both the collegial and bureaucratic models. Childers (1981) considers all three of these models to lie along a continuum formed with the collegial model at one end, the bureaucratic on the other, and the political in the middle. The political model does not completely describe this community college's decision-making process. Analysis of the decision-making process at this institution suggests the possibility of a unique model based on competition for scarce resources. While this new model is political in nature, it is formalized and procedurally oriented as would be a bureaucratic model. This new model also relies on participative discussions and interactions more common to a collegial model. Political considerations can be found in the actions of committees and the fact that the membership of key committees overlaps a great deal.

This model allows administrators flexibility to plan and to change plans according to variation in federal,

state, and local funding. Change and budget are driving forces in this model. Decision makers seek input from specialist and participants. These "level I" staff and faculty members are informally encouraged to participate in a formal, yet unarticulated, process of allocation decision-making. While final authority continues to rest in the hands of the Executive Council, composed of the President and Vice Presidents, they adamantly refuse to prioritize equipment lists from individual departments.

This new model is built upon a formalized competitive framework. This competition is not articulated but a natural adversarial relationship is assumed to be in effect among department heads and members of each department. Competitive struggles are expected among competent specialists as they self-promote their programs in the allocations process. The term "Darwinian" is suggested to describe the fundamental natural competitive concept this model represents. The formal process represents a natural order against which individuals compete for resources.

Table 26

Characteristics of the Decision-Making Process in a Community College Categorized by Theoretical Decision Models.

Characteristics	Model Categories		
	Bureaucratic	Political	Collegial
Problem Identification		x	
Related Committees	x		
Specific committee members appointed		x	
Communication with staff/faculty.			x
External Pressures		x	
Faculty/staff acceptance levels		x	
Staff/faculty input levels		x	
Participative consensus level		x	
Leadership Characteristics	x		
Followership Characteristics	x		

Implications of Results

While this investigative and descriptive study targeted a single community college, implications can be derived from its results. These implications are grouped by their orientation: decision-making and allocation processes, administration and management, and faculty participation and equipment utilization.

Decision-Making and Allocations Processes.

Other community colleges have implemented allocation procedures similar to the process described in this study. The allocation processes in effect at this community college were devised in response to insufficient funding. Scarce funding is a problem common to many public community colleges.

The allocation process is operated within a formalized and structured system. The community college has an effective and flexible process regarding decision making and equipment allocations. However, the faculty and staff at the college do not have full knowledge of and access to the benefits of this process. Analysis of the college's allocations process reveals three levels of hierarchy; level III, the president and vice presidents; level II, deans and department heads, and level I, faculty and staff. The decision-making and planning process is effective only from

level III through level II. While clearly, this is not the intention of the administration, the faculty and staff members only "occasionally" feel part of the process.

Three factors, related to the allocation process, resulted in a general feeling of frustration that increased with an individual's distance in the hierarchy from the level III decision makers. (1) The allocation process was time and labor intensive. (2) Communication within the three levels was not generally effective and often circumvented by committee activities. (3) Departmental structure was underused as a means of generating an upward flow of effective planning and creative ideas from the level I faculty members to level III decision makers. No allowance was made for individuals to voluntarily enter the communication "loop" established by the advisory committee structure.

Administration and Management.

Due to the complexity and technical nature of emerging technologies, college administrators seek help from specialists to assess new equipment, prioritize equipment requests, and justify equipment expense. In general, administrators have a more operational understanding of educational technology and systematic approach to technical transformation than do faculty members (Perelman, 1987). Administrators are pragmatic in their involvement with

educational technology. They are involved with formal and informal informational networks, encourage participation, and attempt to improve the quality of outputs and the school's culture (Naisbitt, 1982). The most important component of this study was the face-to-face interviews with the college administrators. Equally important information could be generated through interviews with faculty members and middle managers, such as deans and department heads.

Faculty Participation and Equipment Utilization.

Faculty members expressed a wide variety of educational technological needs. Faculty members in general felt that they were part of the allocations process, contributed to the educational technology knowledge base of their departments, and had an operational knowledge of educational technology. Nontechnical faculty members exhibited less awareness of educational technology than their technical counterparts. Faculty members also exhibited a wide variety of perceptions regarding the decision-making and allocations processes.

Recommendations

The decision-making and allocation processes developed by the community college established a prioritizing and planning process at the departmental level. The groups of

people at this level were staff and faculty members. Many of these individuals were specialists in their areas. While they often are the authorities in specific areas, they may also be the least informed of the mechanics of the decision-making allocation processes. These people are "cut out of the loop," yet their input is the basis for the primary planning stage for the college. The allocations process must be practiced by each member of each department. Recommendations for improvement of the processes discussed earlier in this chapter lie in the areas of planning, communications, and staff development.

Planning.

Planning is an area that is fully compatible with the decision-making and allocation processes described in this study. Elements of this process--departmental meetings, consensus decision, team building, and delegation of authority--are a fertile environment for departmental level planning. The college does encourage short-term and long-term planning with a two year projection. Departments can develop consensus short-term and long-term goals following the same process used to develop equipment requests lists.

This process involves participation and time. Initially, the process may need the help of a facilitator.

The facilitator will encourage each person to plan individually, justify all objectives resulting in equipment needs, and take part in departmental negotiations in developing departmental plans.

Communication.

Staff and faculty must be told of the adversarial relationship existing in the "real" model as depicted in this study. They must compete for their share of allocations to function competently in this system.

The process of allocations was not spelled out sufficiently for level I staff and faculty. While the process appears to be a good one, better effect might be reached by implementing the process at the base level. Also, the effect of the Executive Council and the crucial role of the President in this process were not described in school literature. Portions of the process were hidden. Administrators have learned the allocation process here or a similar process at some other college. Apparently, the administrators function effectively in this institutional culture.

Staff Development.

A specific need identified in this study relates to the general information process related to educational technology. The majority of faculty members did not know

what equipment was available to them through either the Learning Resources Center (LRC) or the Local Area Network (LAN) computer system. The ignorance about both major sources of equipment and software indicated a need for staff development workshops and better methods of communicating available resources.

A recommendation of this study is to develop written materials and hands-on workshops to inform faculty and staff members of specific resources that are available to them. Workshops can focus on these two areas of deficiency

Topics for Further Study.

The self-study nature of this study limits broad generalities regarding educational technology and community colleges as a group. However, the possibility of a uniform allocation process used by other community colleges was mentioned by three administrators during the course of this study. An intriguing follow-up study could entail a random survey of faculty members and administrators of several community colleges in the North Carolina Community College system to determine whether equipment allocation processes were similar.

Another intriguing question involves where the decision-making process originates within an institution. If the allocation process is not written down, but assimilated

culturally, then how does this acculturation take place. How does this process affect leadership changes? How does the state-wide leadership view the allocations process demonstrated at this college? Does the state-wide leadership promote any process?

This study has identified a breakdown of process at the Level I, or faculty/staff level of the organization. According to administrator interviews, this process is intended to be a fully participative consensus-building enterprise. A recommendation of this study is to investigate the participative aspect of the decision-making process emphasizing the role of the individual staff or faculty member. How do these individuals feel about the process? Do they feel included? How can they be encouraged to participate?

Questions regarding the overall use of educational technology by faculty members could reveal whether various colleges placed the same utilization emphasis on selected equipment. Do all colleges extensively utilize videotapes and television? Are all colleges spending the vast majority of their equipment allocations on computer related equipment?

Studies focusing on bureaucratic communications, both vertically and horizontally within a community college, could possibly identify problem areas and suggest strategies to improve informational flow. What information is

communicated informally? Formally? To new employees? How long does it take an employee of a college to be fully acculturated?

A more comprehensive utilization survey is needed. Community college faculty members do have an individual focus on their specific curriculum interest and have a corresponding focus in educational technology specific to their field. But how are new technologies changing individual curriculums? How can individual departments anticipate the technological needs of businesses and industries and make corresponding curriculum changes to prepare community college graduates better? Additional study is needed to identify technologies germane to specific curricula and identify trends in new technology utilization.

BIBLIOGRAPHY

Aldridge, H., & Pfeffer, J. (1976). Environments of organizations. Annual review of sociology. Vol. 2, p. 79-105.

Allison, G. (1971). Essence of decision: Explaining the Cuban missle crisis. Boston: Little Brown.

Astin, A. W. (1985). Achieving educational excellence. San Francisco: Jossey-Bass.

Bacharach, S., & Lawler, E. (1980). Power and politics in organizations. San Francisco: Jossey-Bass.

Baldridge, J. (1971). Power and conflict in the university. New York: Wiley.

Baldridge, J., Curtis, D., Ecker, G., & Riley, G. (1977). Alternative models of governance in higher education. In J. Baldridge & T. Deal (Eds.), Governing academic organizations. Berkeley: McCutchan.

Becker, S., & Gordon, G. (1964). People, personality and complex organizations. Journal of the College and University Prsonnel Association. vol.16. pp. 17-23.

Bennis, W., & Nanus, B. (1985). Leaders: The strategies for taking charge. New York: Harper & Row.

Berdie, D. R., & Anderson, H. G. (1974). Questionnaires: Design and use. Metuchen, NJ: Scarecrow Press.

Bess, J. L. (1988). Collegiality and bureaucracy in the modern university. New York: Teachers College Press.

Birnbaum, R. (1988). How colleges work: The cybernetics of academic organization and leadership. San Francisco: Jossey-Bass.

Blau, P. (1973). The organization of academic work. New York: Wiley.

Bloom, B. S. (1956). Taxonomy of educational objectives. New York: McKay.

Boone, B., Marak, D., & Wilkins, N. (1989). The Impact of high technology: A survey of rural, suburban, and urban library media centers. Educatioinal Technology. Vol. 30. No. 1. pp.38-42.

Bowen H., & Schuster, J. (1986). American professors: A national resource imperiled. New York: Oxford University Press.

Bowers, C. A. (1988). The cultural dimensions of educational computing: Understanding the non-neutrality of technology. New York: Teachers College Press.

Boyd, B. (1984). Management-minded supervision. New York: McGraw-Hill.

Brooker, F. E. (1946). Training films for industry. Washington, D.C.: U.S. Office of Education, Federal Security Agency.

Brubacher, J. S. (1966). A history of the problems of education. New York: McGraw-Hill.

Brubacher, J., & Rudy, W. (1976). Higher education in transition. New York: Harper & Row.

Bunting, L. D. (1989). First step in the feasibility of interactive satellite communications between the member institutions of the league for innovation in the community colleges. Dissertation Abstracts International. 51A, No. 1, p.61.

Carnegie Commission on Education. (1972). The Fourth revolution: Instructional technology in higher education. New York: McGraw-Hill.

Carrott, C. (1990). The nature and use of management information systems in modern language administration. ERIC. ED 322, 633.

Carter, E. (1986). Meeting the challenge of change: An opportunity for research in the community college. New Directions for Community Colleges, 56, 85-97.

Cellucci, P. (1989). A case study of community college decision-making processes. Unpublished doctoral dissertation. University of North Carolina at Chapel Hill.

Childers, M. What is political about bureaucratic-collegial decision-making? The Review of higher education. Fall 1991. 5, 1, p. 25-47.

Cohen, A., & Brawer, F. (1982). The collegiate function of community colleges. San Francisco: Jossey Bass.

Cohen, M., & Marsh, J. (1974). Leadership and ambiguity: The American college president. New York: McGraw-Hill.

Commission on Instructional Technology. 1970. To Improve learning, vols. 1 and 2 (edited by S. G. Tickton). New York: R. R. Bowker Co.

Cross, K. (1985). Determining missions and priorities for the fifth generation. In W.Deegan, D. Tillery, & Associates. (Ed.). Renewing the American community college. pp. 34-38. San Francisco: Jossey-Bass.

Cuban, L. (1986). Teachers and machines. New York: Teachers College Press.

Dewey, J. (1933). How we think. Lexington, MA: D.C. Heath.

Donovan, R. A. (1985). Creating effective programs for developmental education. In W.Deegan, D. Tillery, & Associates. (Ed.). Renewing the American community college. pp. 103-128. San Francisco: Jossey-Bass.

Drapeau, G. D. (1992). The maestro multimedia authoring environment. Technological Horizons in Education Journal. 19 (7).

Duncan, K. (1972). Strategies for analysis of the task. In J. Hartley (Ed.) Strategies for programmed instruction: An education technology. London: Butterworths.

Emery, F. E., & Trist, E. L. (1972). The socio-technical system as a source concept. (appendix). In Towards a social ecology. New York: Plenum Press.

Evans, R. (1982). Resistance to innovations in informational technology in higher education: A Social psychological approach. In A. Sheehan, (Ed.), Information Technology: Innovations and applications. New York: Springer.

Feldman, M. (1985). Establishing linkages with other educational providers. In W. Deegan, D. Tillery, & Associates. (Eds.) Information technology: Innovations and applications. (pp. 175-196). San Francisco: Jossey-Bass.

Fey, P. & Hankin, H. (1985). "Reassessing the commitment to community services." W. Deegan & D. Tillery editors. Renewing the American community college. San Francisco: Jossey-Bass.

Gagne, R. M. (1965). The Conditions of learning. New York: Holt, Rinehart & Winston.

Gerver, E. (1984). Computers and adult learning. Milton Keynes, England: Open University Press.

Glasser, W. (1969). Schools without failure. New York: Harper & Row.

Goetz, J. P., & LeCompte, M. D. (1986). Ethnography and qualitative design in educational research. New York: Academic Press.

Gibson, F. & Hawkins B. (1968). Interviews versus questionnaires. American behavioral scientist, 12 (1), NS-9--NS-11.

Hage, H. & Aiken, M. (1970). Social change in complex organizations. New York: Random House.

Hankin, J. N. & Fey, P. A. (1985). Reassessing the commitment to community services. In W. Deegan, D. Tillery, & Associates. (Eds.) Renewing the American community college. PP. 150-174 San Francisco: Jossey-Bass.

Hefzallah, I. M. (1990). The New learning and telecommlunications technologies. Springfield, IL: Charles C. Thomas

Hergenhahn, B. R. (1976). An introduction to theories of learning. Englewood Cliffs, NJ: Prentice-Hall.

Hersey, P. & Blanchard, K. (1988). Management of organizational behavior: Utilizing human resources. Englewood Cliffs, NJ: Prentice-Hall.

Hoban, C. F. (1946). Movies that teach. New York: Dryden Press.

Judd, C. H. (1923) Report of the Committee on Visual Eduation and Cooperation with the Motion Picture Producers and Distributors, Inc. to the National Education Association. Washington, DC: National Education Association.

Kanter, R. (1985). The Change masters: innovation and entrepreneurship in the American corporation. New York: Simon and Schuster.

Kerr, C. (1988). Renewing the american community college: priorities and strategies for effective leadership. Deegan & Tillery, eds. San Francisco, CA: Jossey-Bass.

Knirk, F. & Gustafson, K. (1986). Instructional technology: A systematic approach to education. NY: Holt, Rinehart, and Winston.

Leigh, W. E. & Doherty, M. E. (1986). Decision support and expert systems. Cincinnati, OH: South-Western.

Levine, A. (1980). Why innovation fails. Albany: State University of New York Press.

Lewin, K. (19510. Field theory in social science. New York: Harper & Row.

McClusky, F. D. (1924). The Administration of visual education: A National survey. Unpublished report presented to NEA Committee on Visual Education and Cooperation with the Motion picture Producers. Washington, DC: National Education Association.

MacDonald-Ross, M. (1973). Behavioural objectives: A critical review. Instructional Science no. 2. 1-52.

McLuhan, M. & Fiore, Q. (1967). The medium is the message. New York: Bantam.

Management discovers the human side of automation. (1986). Business Week. Sept. 29.

Mann, F. & Neff, F. (1961). Managing major change in organizations. Ann Arbor, MI: Foundation for Research on Human Behavior.

March, J. G. & Simon, H. A. (1958). Organizations. New York: Wiley.

Messer, S. et al. (Eds.) (1988). Hermeneutics and psychological theory .New Brunswick, NJ: Rutgers University Press.

Moore, G. (1989). Diffusion of innovation. Unpublished paper. University of North Carolina at Greensboro.

Monroe, C. R. (1974). Profile of the community college. San Francisco: Jossey-Bass.

Naisbitt, J. (1982). Megatrends. New York: Warner Books.

Nickerson, R. S. (1988). Technology in education in 2020: Thinking about the not-distant future. In R. Nickerson & P. Zodhiates (Eds.). Technology in education: Looking toward 2020. Hillsdale, NJ: Lawrence Erlbaum.

Norris, A. (1985) Title III curriculum enrichment activity: Instructional suport program evaluation. Reading, PA: Reading Area Community College.

Ouchi, W. (1981). Theory Z. New York: Avon.

Palinchak, R. (1973). The evolution of the community college. Metuchen, NJ: Scarecrow Press.

Parsons, T. (1951). The Social system. Glencoe, IL: The Free press.

Pascale, T., & Athos, A. (1981). The art of Japanese management. New York: Warner Books.

Payne, S. L., (1951). The art of asking questions. Princeton, NJ: Princeton University.

Pea, R. D. (1988). Putting knowledge to use. In R. Nickerson & P. Zodhiates (Eds.). Technology in education: Looking toward 2020. Hillsdale, NJ: Lawrence Erlbaum Associates.

Perelman, L. J. (1987). A report of the ITTE Technology Leadership Network from the Institute for the Transfer of Technology, Technology and transformation of schools. Alexandris, VA: National School Boards Association.

Percival, F., & Ellington, H. (1984). A handbook of educational technology. London: Kogan Page.

Peters, T., & Austin, N. (1985). A passion for excellence. New York: Random House.

Pfeffer, J. (1981). Management as symbolic action: The Creation and maintenance of organizational paradigms. Research in Organizational Behavior, No. 3, 1-52.

Pring, R. (1971). Bloom's taxonomy: A philosophical critique. Cambridge Journal of Education, no. 2.

Rippa, S. A. (1984). Education in a free society. New York: Longman.

Saettler, P. (1990). The Evolution of American educational technology. Englewood, CO: Libraries Unlimited.

Schein, E. (1975). Professional education: Some new directions. In Sponsored research of the Carnegie commission on higher education. New York: McGraw-Hill.

Schramm, W. (1977). Big media little media. Beverly Hills, CA: Sage Publications.

Sendov, B. (1986). The Second wave: Problems of computer education. In Ennals, Gwyn, & Zdravcheo (Eds.). Information technology and education: The Changing school. New York: Ellis Horwood Limited.

Sheatsley, P. B. (1983). Questionnaire constuction and item writing. In P. Rossi, J. Wright, & A. Anderson (Eds.). Handbook of survey research. pp. 195-230. New York: Academic Press.

Skinner, B. F. (1958). Teaching machines. Science, 128. 971.

Skinner, B. F. (1968). The Technology of teaching. Englewood Cliffs, NJ: Prentice-Hall.

Smelser, N. (1959). Social change in the industrial revolution: An application of theory to the lancashire cotton industry. Chicago: University of Chicago Press.

Smith, M., & Beck, J. (1984). Image of the community college during the 1070s: A study of perceptions. Community Junior College Quarterly. Vol. 8. PP. 233-241.

Stanly Community College. (1992). Staff and faculty handbook. Albemarle, NC: Stanly Community College.

Tillery, D. & Deegan, W. (1985). The evolution of two-year colleges through four generations. In D. Tillery & W. Deegan (Eds.). Renewing the American community college. San Francisco: Jossey-Bass.

Thomas, M., & Kobayaski, V. (Eds.). (1987). Educational technology: Its creation, development, and cross-cultural transfer. New York: Pergamon.

Toffler, A. (1970). Future shock. New York, New York: Bantam.

Toffler, A. (1974). Today. In American education in the electric age. P. Klinge (Ed.). Englewood Cliffs, NJ: Educational Technology Publications.

Wagner, L. (1982). The Economics of educational media. New York: St. Martins's Press.

Weber, M. (1946). The theory of social and economic organization. (A. M. Henderson, trans.; ed. T. Parsons). New York: Oxford University Press.

Weiss, C. H. (1986). The stakeholder approach to evaluation: origins and promise. In E. House (Ed.). New directions in educational evaluation. edited by House, E. R. Philadelphia, Falmer. p. 145-157.

Wenger, G. & Lemme, R. (1987). Developing an institutional plan for computing. Glen Ellyn, Il: College of Dupage.

Worthen, B. & Sanders, J. (1987). Educational evaluation: Alternative approaches and practical guidelines. New York: Longman.

APPENDIX A

ADMINISTRATOR INTERVIEW QUESTIONS

The purpose of this data collection process is to obtain information from administrators that will help provide a comprehensive understanding of the decision-making process affecting the allocation, control, and purchase of educational technology at Stanly Community College. This interview procedure is part of a triangulated study focusing on educational technology utilization and allocations at a community college. Further, this is an open-ended self-study that welcomes ideas, insights, suggestions, and criticisms from administrators. The structure of this interview is not limited to the questions included in this guide nor a single interview session. You are invited and encouraged to add any information you consider significant to this study.

Definition of educational technology: Any electronic device which helps faculty, staff, and students learn, teach, store information, generate information, communicate, and manage resources.

Research question # 1: What is the relationship between the decision-making process and the user of educational technology?

1) How do individuals and departments in this college request educational technology? What is your role in this process?

2) How do you respond to requests for educational technology in your department?

3) How do faculty and staff members formally request educational technology? How are informal requests made?

Research question # 2: How do decision-makers select educational technology at a community college?

4) What information do you use to help you better understand and function with educational technology?

5) What concerns do you have with educational technology? Where are the problem area at this community college?

6) What concerns do you have with the selection process regarding educational technology at this community college?

7) What information networks are available to you regarding educational technology matters?

Research question # 3: What are the procedures for governing control, allocation, and purchase of educational technology at a community college?

8) Describe the decision-making process at SCC regarding the allocation of educational technology. What is your role in this process?

9) How do the procedures governing educational technology at this college differ from that at other colleges? What is unique to this school?

10) Are decisions made through an administrative team approach? If so how are these decisions reached?

11) What procedure do you personally follow to make decisions regarding educational technology? What criteria are significant for these decisions?

12) How is the procedure used at this school sensitive and responsive to the particular needs of this college.

APPENDIX B

FACULTY SURVEY

This survey is part of a case study intended to provide in-depth information regarding the educational technology a community college faculty uses and how that technology is acquired. Hopefully, information derived from this study will help provide a better understanding of complicated acquisitions processes. According to an extensive search, this is the first study ever conducted in this specific area.

Definition of educational technology: Educational technology (ed tech) is any electronic device, equipment, hardware, software, or media that enables an instructor to teach, conduct research, manage, and grow professionally. This definition includes all computers, calculators, typewriters, dictation equipment, television, projected media, distance education, broadcast and cablecast media, and combinations of the above.

I. Faculty Identification

1. I am presently:
   __ an instructor,
   __ department head,
   __ acting department head.

2. I am:
   __ in a technical curriculum,
   __ in a vocational curriculum,
   __ in general education/transfer.

II. Faculty Perceptions

Please Use the Following Scale:
1 Always
2 Usually
3 Occasionally
4 Seldom
5 Never
Circle your response.

1. I have input into the educational technology equipment selection process.	1	2	3	4	5
2. My requests for educational technology are satisfactorily handled.	1	2	3	4	5
3. School administrators effectively select appropriate educational technology within budget limitations.	1	2	3	4	5
4. I am part of the educational technology selection process.	1	2	3	4	5
5. My department has adequate control over acquisition of educational technology for its needs.	1	2	3	4	5
6. I understand the acquisition/purchase process used by the college to acquire educational technology.	1	2	3	4	5

7. I feel comfortable with new educational technologies.	1	2	3	4	5
8. I contribute to the educational technology knowledge base of my department.	1	2	3	4	5
9. I seek information regarding educational technology applicable to my field.	1	2	3	4	5
10. I feel comfortable with my skill levels operating educational technology appropriate for my curriculum.	1	2	3	4	5
11. I know where to obtain reliable information regarding educational technology.	1	2	3	4	5

Circle the appropriate number to indicate your response:

12. Who controls acquisition of educational technology needed for your department?
    1. me
    2. my department head
    3. VP of Instruction
    4. VP of Business
    5. other.....
       (please indicate)

13. I have requested purchase of educational technology for my curriculum this year.
    1. more than 15 items,
    2. 10-15 items,
    3. 5-10 items,
    4. 1-5 items,
    5. 0 items,

Short Written Response:

14. Briefly describe the process by which you request and receive needed educational technology.

15. Briefly describe the process by which decisions are made regarding selection and purchase of educational technology at the college.

Short Written Response:

16. How would you prefer the educational technology section process to take place?

III. A. Faculty Opinions.

Please Use the Following Scale:
1 Strongly Agree
2 Agree
3 Undecided
4 Disagree
5 Strongly Disagree
Circle the number of your response.

17. Numbers of computers in my department for instruction, class management, and research are adequate.	1	2	3	4	5
18. There should be an increase in the purchase of computer software for my curriculum within the next 1-3 years.	1	2	3	4	5
19. There should be an increase in the purchase of video equipment for classroom use in the next 1-3 years.	1	2	3	4	5
20. Videotape purchase should be increased in the next 1-3 years.	1	2	3	4	5
21. Numbers of overhead projectors should be increased in the next 1-3 years.	1	2	3	4	5

22. The cost of video equipment has been a deterrent to their purchase for classrooms use. 1 2 3 4 5

23. The cost of computer software has been a deterrent to their purchase for the college. 1 2 3 4 5

Indicate: (1) current availability of equipment through department or Learning Resources Center;
(2) your use of equipment (D = daily, W = weekly, M = monthly, N = never); and
(3) your request for equipment purchase (for next 1-3 years) for following equipment list.

Equipment	(1) Availability Y (yes) N (no)	(2) Use D (daily) W (weekly) M (monthly) N (never)	(3) Request Y (yes) N (no)
24. Television/Monitor	(1) Y N	(2) D W M N	(3) Y N
25. Video Recorder	(1) Y N	(2) D W M N	(3) Y N
26. Camcorder	(1) Y N	(2) D W M N	(3) Y N
27. Video Editing	(1) Y N	(2) D W M N	(3) Y N
28. Apple II Computer	(1) Y N	(2) D W M N	(3) Y N
29. MacIntosh Computer	(1) Y N	(2) D W M N	(3) Y N
30. IBM (clone) 286	(1) Y N	(2) D W M N	(3) Y N
31. IBM (clone) 386	(1) Y N	(2) D W M N	(3) Y N
32. IBM (clone) 486	(1) Y N	(2) D W M N	(3) Y N
33. Printer	(1) Y N	(2) D W M N	(3) Y N
34. CD-ROM	(1) Y N	(2) D W M N	(3) Y N
35. Multi-Media	(1) Y N	(2) D W M N	(3) Y N

Equipment	(1) Availability Y (yes) N (no)	(2) Use D (daily) W (weekly) M (monthly) N (never)	(3) Request Y (yes) N (no)
36. LCD Overhead Proj.	(1) Y N	(2) D W M N	(3) Y N
37. Computer Network	(1) Y N	(2) D W M N	(3) Y N
38. Slide Projector	(1) Y N	(2) D W M N	(3) Y N
39. Sound/Filmstrip Proj.	(1) Y N	(2) D W M N	(3) Y N
40. CD Player	(1) Y N	(2) D W M N	(3) Y N
41. Audio Recorder	(1) Y N	(2) D W M N	(3) Y N
42. Overhead Projector	(1) Y N	(2) D W M N	(3) Y N
43. 16mm Movie Proj.	(1) Y N	(2) D W M N	(3) Y N
44. Modem	(1) Y N	(2) D W M N	(3) Y N
45. Satellite Receiver	(1) Y N	(2) D W M N	(3) Y N
46. Fiber Optics	(1) Y N	(2) D W M N	(3) Y N
47. Electronic Mail	(1) Y N	(2) D W M N	(3) Y N