

DOCUMENT RESUME

ED 055 453

EM 009 301

TITLE A Study of a Proposed Multi-Purpose Communications System.

INSTITUTION Washington State Univ., Pullman.

PUB DATE 30 Jul 71

NOTE 131p.

EDRS PRICE MF-\$0.65 HC-\$6.58

DESCRIPTORS Continuing Education Centers; *Feasibility Studies; *Instructional Television; Microwave Relay Systems; State Programs; *Statewide Planning; Teacher Attitudes; *Telecommunication; Telephone Communication Systems; Television; *University Extension

ABSTRACT

A faculty committee, consisting of members from various departments and from the Audiovisual Center at Washington State University (WSU), investigated the feasibility of establishing a two-way television network in the southeastern Washington area for participants in continuing education studies and for certain graduate classes. The committee surveyed the faculty of various university departments to find out what their attitude was toward such a system and how much they thought it would be used by their department. They approached potential vendors of equipment for such a system and obtained cost estimates. Based on their survey they recommended that WSU take the initiative in establishing a model or prototype system. The proposed system would eventually cover the state of Washington and would include one and two-way television communication and channels for voice communication, data, teletype, and facsimile reproduction. They estimated that the university would use the system for 177 hours per week and thus would require two duplex broadband dedicated channels. They found a wide variety of attitudes among faculty members toward the system, ranging from enthusiasm to skepticism, and a wide variation among departments as to their estimates of the amount of time they would use it. Several ways of financing such a system were suggested. (JY)

LETTER OF TRANSMITTAL

TO: Dr. Wallis Beasley
Executive Vice-President

FROM: J. W. Hardie *J. W. Hardie*
Chairman, Study Committee
Multi-purpose Telecommunications Network

DATE: July 30, 1971

SUBJECT: Final Report

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The Committee is pleased to submit their findings regarding a proposed multi-purpose communications system for use by Washington State University.

The Committee sought and received broad involvement in this study. Many people have devoted considerable time and effort toward the conclusions which were reached. It is interesting to note there seemed to be identified sufficient uses by WSU by itself to justify the need for a multi-purpose network. However, the Committee is recommending the development of a state telecommunications network which is designed to serve a broad range of users with multiple types of communication capability. WSU would be only one of the users, and the network, even though it may have its start at WSU, would eventually be under the direction and supervision of an appropriate state agency.

Washington State University seems to have assumed somewhat of a leadership role in the development of a state-wide network. As a first phase in such development, it is recommending that a prototype system be established on the campus at WSU and a significant program of training for potential users be undertaken. The Committee feels that outside funding sources can be found to assist in the implementation of such a program if the University will authorize a search for such resources.

The Committee suggests that due to the unusual amount of interest in this study, that copies be made available to appropriate persons on our own campus and elsewhere. Due to the size and nature of this report, only two others are in the hands of committee members. Also, the Committee anticipates that you may receive a number of requests for copies of the study due to the interest in the objectives of the subject matter and in the process through which the study was conducted.

With this report the Committee assumes it has concluded the specific task which you assigned and that it is now dissolved. However, if there are other details or further action which you would like it to accomplish, it will be happy to do so.

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FOREWORD

In the Fall and Winter, 1969-70, the Director of General Extension at Washington State University requested the Audio-Visual Center faculty to conduct a feasibility study for a proposed telecommunications network system that would connect the University with five communities in Eastern Washington. Performance specifications were developed and sent to the telephone companies and microwave common carriers requesting them to provide cost estimates for providing such a communications system. The Microwave Transmission Corporation and General Telephone of the Northwest responded, and provided proposals based upon the specifications given to them.

Meetings with deans, department heads, and program directors were held. Seventeen prepared memorandums describing ways that such a system might benefit their programs, and stating their interest in such a development. The Audio-Visual Center passed this information to Dr. Wallis Beasley, Executive Vice-President. Formal presentations were made to the Administration of the University by representatives of the Microwave Transmission Corporation and General Telephone of the Northwest concerning their proposals.

In March, 1970, Dr. Beasley appointed a committee to organize a depth study of the proposed telecommunications network. The study was to provide broad involvement of the University community to determine potential need and use of such a network, and evaluation as to the soundness of the proposed concepts of the network. Seven subcommittees were appointed, and a great deal of time has been given to this study by scores of people in order to obtain needed information.

Because this effort has been "over and beyond" the normal work loads of all who have assisted with this study, the Coordinating Committee would like to acknowledge and express its appreciation to all who have given so freely

of their time and talent. Such cooperative effort and team work speaks well for the health and vitality of this University.

J. W. Hardie, Chairman
J. Reginald Miller
Arnold Gallegos

DESCRIPTION OF CAPABILITIES OF THE PROPOSED MULTI-PURPOSE TELECOMMUNICATIONS SYSTEM

The study of the proposed telecommunication network calls for eventual statewide coverage, providing use of the system by a large number of different users, utilizing several types of communications capabilities. The types of communication would include 1) one and two-way television communication, and 2) channels for voice communication, data, teletype, and facsimile reproduction.

One and Two-Way Television Communication

Video information may be distributed from any one location on the network to another, or to several points simultaneously. Videotapes, drawings, photographs, motion pictures, printed materials, or live television presentations can be distributed or transmitted over this system within the normal limits of quality, high resolution black and white or color television.

Two-way television can be used for communication between individuals or groups where visual display is important. Two-way television communication can be conducted between any two, or multiple points on the network. Conferences, meetings, instruction, and other applications that bring people together electronically are possible. When only two locations are in communication, both have full video and audio communication with each other. When multiple locations are simultaneously in communication, a simple switching control at one of the locations will allow any one of the locations at any one time to be seen by all others. All points remain in continuous audio communication with each other.

A broadband video phone facility, which would accommodate communication between individuals when visual display is important to the communication, has been proposed. A person speaking from such a unit could communicate with an individual in a similar facility, or with a group properly equipped for two-way television communication. He would be seen and heard by the group, and could see and interact with them.

A minimum of two broadband duplex microwave channels (4 channels) with twenty-four hour dedicated service use was recommended. This would provide the potential of multiple simultaneous uses of video communication between all locations on the network system.

Independent Voice Grade Communication Capabilities

The system proposed by the Microwave Transmission Corporation provides side-band channels capable of handling several voice-grade duplex (two-way) channels simultaneously, independent of the duplex video operations. If the beginning cross-state network provided two duplex video broadband microwave channels, as proposed, there would be 24 voice grade duplex channels available for use between all locations served by the network. It would be possible to access these channels from regular telephone instruments, dial on-line to other points, then off-line into local telephone facilities.

Accessing computers for data transmission, communication between teletype or CRT terminals, and facsimile transmission of library or other materials would all be possible over these dedicated side-band channels. These channels provide a communications capability of considerable dimensions.

In the proposal from General Telephone Company of the Northwest, a similar communications capability would be provided through Telpak facilities.

CHAPTER I

BACKGROUND OF THE STUDY

The Problem and Purpose of the Study

During the year 1969, and at the request of the General Extension Service, the Audio-Visual Center at Washington State University conducted an investigation into the feasibility of establishing a two-way television network in the southeastern Washington area for participants in continuing education studies and for certain classes at the Graduate Center at Richland. As a result of this investigation which included important assistance from the Microwave Transmission Corporation, it became apparent that some faculty and several specific departments were particularly interested in this capability even though the costs for establishment and operation of such a network seemed to put it beyond the realm of possibility. Several departments suggested that if a television communication facility was possible, they would have considerably more use for one which would connect across state to the University of Washington or at least to some western Washington terminal.

Because of the evident interest and the probability that such capabilities would eventually be required in the expanding role of the University in serving the growing educational interests of the state, a more detailed study was indicated. For that reason, on March 19, 1970, Dr. Wallis Beasley, Executive Vice-President, appointed a three-man committee for the purpose of studying the need for a multi-purpose communication system. Members were Mr. James Hardie, Instructional Television Coordinator for the Audio-Visual Center, Chairman; Dr. Arnold Gallegos, Associate Professor of Education; and Mr. J. Reginald Miller, Director of University Relations.

In his charge to the committee Dr. Beasley asked that it study in-

depth the proposal to establish a multi-purpose communications system for Washington State University and suggested the following questions:

1. Is the scheme educationally sound?
2. What are the costs on an hourly basis as well as on an annual basis?
3. Do the advantages of such a system justify the expenses involved?
4. Should we develop this system as a pilot project for the state or should other institutions be involved?
5. What sources of funding are available?
6. What problems exist with respect to faculty time in preparing courses for this medium, and what problems may arise with respect to additional remuneration for participating faculty?

The mandate went on to say these questions were not meant to be exhaustive but only suggestive, and that other resource people should be utilized as required. Dr. Beasley also suggested that Mr. Leon W. Hevly of the University of Washington be included on the committee as an ex-officio member.

It soon became apparent that this small committee could not hope to produce a satisfactory in-depth study without involving many other members of the University community. For that reason the chairman asked Dr. Beasley to appoint subcommittee chairmen for seven additional committees to study various facets of the proposed system which included Faculty Rights, Continuing Education/Extension, Library, Community Colleges, Administration, Medical, and Academic. With this additional help and involvement, the study was then pressed forward.

The nub of the problem was to determine:

1. how a microwave communications network providing for two-way television communications, data transmission, voice channels, teletype, and electronic facsimile reproduction, might be used by the Colleges and Departments at WSU.
2. whether the development of a so-called first phase system which would interconnect the Pullman campus with Spokane, Richland, Pasco, Walla Walla, and Prosser was feasible, or, whether a basic

network should from its inception be one that would eventually serve the entire state and connect the Pullman campus to Spokane, the Graduate Center at Richland, and the University of Washington in Seattle.

3. what kinds of use would be made of such a system, by what various academic and other departments, and approximately how many hours per day.
4. the identification of possible non-teaching activities such as meetings, information distribution, consultation, data exchange, interlibrary information transmission, etc.
5. how much time would be utilized for teaching purposes, the exchange of teaching commitments between universities, colleges and community colleges, and the probable use of other such group devices which might stimulate savings through travel economies at the same time it made resource people available who would otherwise not be able to participate.
6. how much would the use of such a system increase the need for more personnel from both a technical and teaching standpoint.
7. the matter of faculty rights and the entire problem of released time or additional compensation.
8. how such a system could be funded or at least started on an experimental basis.
9. the need to plan for such a beginning network that could eventually be administered by a more appropriate state agency to serve many other state agencies in their growing need to communicate to areas within the state.
10. the final recommendation by the study committee and a summary of the indicated need, possible funding, potential services and growth, and proposed structure of such an embryonic network.

Review of Network Developments

A number of communication networks of various sizes and types, including educational and/or state communication needs have become operational in the past several years. It is not the purpose of this study to document a large number of such networks. Rather, brief documentation is made of representative network arrangements, and studies that have recently been reported concerning relevant network planning. Such documentation should contribute to an understanding of the present "state of the art" in network technology.

In the publication, Linking Universities by Technology¹, the authors reported that British Universities in the 1960's had developed decision-making processes regarding the utilization of television in instructional applications for a single university. There was not, however, an established network for inter-university cooperative decision-making within the university system. It was also noted that cooperation was hindered because:

The process of learning and definition of objectives in teaching were of less interest to the average university teacher than the development of his own research and his reputation as a scholar. Indeed, the idea that the definition of objectives, in any but the broadest sense, was central to the sensible development of university teaching, was only beginning to make headway at the end of the decade. And thus, in asking Universities to define educational problems which might be solved by the inter-university communications, we were asking them to do something which they did not normally do for their own internal purposes.²

While the climate regarding this problem has improved in the United States in the late 1960's and beginning 1970's, this statement pinpoints one of the major problems in developing inter-institutional cooperation in network planning for instructional applications.

¹Perraton, H. D.; Wade, D. A. L.; and Fox, J. W. R. Linking Universities by Technology (Cambridge: National Extension College, 1969), P. 83.

²Ibid., p. 14

H. D. Perraton conducted a study of Universities in the United States and Canada to see how they were using telecommunications to exchange teaching and research. Mr. Perraton described the progress of four successful operations in networking in the U.S. and Canada. His descriptions are summarized as follows:

1. North Texas TAGER

The TAGER network in North Texas has three different functions: (a) to provide post-graduate engineering teaching to industry in the area, (b) sharing of the teaching load of basic teaching among member universities, and (c) allow universities involved to share subject specialists.

TAGER (The Association for Graduate Engineering and Research of North Texas) is a consortium of eight privately supported institutions of higher education in and around Dallas, Texas. A television network connects their campuses and also links 31 classrooms at 11 different industrial sites. The system provides a talkback capability utilizing telephones allowing for voice interaction. One of the purposes of the TAGER system is to provide graduate engineers to work on their graduate degrees at the location where they are employed. The instruction by television is not like a typical television program. Live instruction emphasizes communication rather than production. If a student has a question or wants to make a point in discussion, he lifts his telephone and his comments are heard by all participants.

The TAGER system is also being used to enable Southern Methodist University Institute of Technology to avoid establishment of an aerospace department on campus. Instead they cooperate with the Southwest Center for Advanced Studies that has such a program. Students at the campus of SMU are taught over the TAGER network.

Other departments of the Universities use the network. In Physics, four Universities offering a Ph.D. degree program have a common core curriculum which makes up about 50% of the formal instruction a Ph.D. student receives. The teaching load is shared equally by the four institutions concerned. The teaching is not by highly specialized personnel, but rather basic teaching. Geology, on the other hand, uses the network to share courses taught by professors who have highly specialized personnel within their discipline.

Stanford University and several other Universities in the U.S. have developed similar programs, and have drawn heavily from the Dallas experience.

2. The Commission Interuniversitaire of the Canadian French-speaking Universities

The Commission Interuniversitaire of the Canadian French-speaking Universities was established in the early 1960's. A group of the Universities' extension departments jointly administer a service of television broadcasts coordinated with correspondent course work. The Commission acts as an inter-university body in developing common broadcast courses, provide some written materials for them, and coordinate examinations.

The Commission seeks advice from subcommittees in developing courses, consisting of faculty members from the member universities. They first agree on a syllabus and credit hours to be allotted. The outline agreement is then sent back to member universities for approval through normal channels. Once approval by all member universities is obtained, an appropriate scriptwriter and presenter are sought. Courses are presented over television (Canadian Broadcasting Corp.).

3. The Inter-University Communications Council -- EDUCOM

EDUCOM is a national organization with member universities throughout the U.S. and in Canada and Mexico. Established in 1964 by a Kellogg Foundation Grant, it, at first, gave the impression that it sought to develop a network to link computer facilities of member universities. Actually, it now seeks to investigate the many different ways cooperative use of communications technology can help universities solve major educational problems. It has three developing programs:

- a. Education Information Network, is designed to enable Universities to share their computer software by building up a catalog of computer programs. Development of inter-university communications is hampered by lack of intra-mural communications.
- b. Practice-oriented Information System Experiment is a program designed to improve the abstracting and bibliographical services available to practicing scientists and engineers. It is an attempt to develop practice-oriented information files in cross-discipline areas.
- c. Community Learning Centers are designed to provide a solution to the problem of higher education in the ghetto areas with emphasis upon learning, rather than teaching. EDUCOM plans to develop and use recorded teaching materials from many sources. Working with high school dropouts to post-graduate retraining, it seeks to use communication techniques to provide people in the poorest areas of cities with the benefits of the finest teaching systems. EDUCOM also hopes to develop learning materials and testing services so that the principal role of the teacher is neither the transmitter of information nor administrator of

tests, but as a counsellor to students. EDUCOM is concerned with all means of communication and points to the relationship between libraries, computers, and television services as a single question rather than separate ones.

4. The State University of New York -- SUNY

SUNY is a single University, incorporating virtually every unit of public higher education throughout the State of New York. The Vice-Chancellor for Educational Communications has indicated they feel it is important to find a right balance between large-group and small-group learning situations, and the cooperative use of television that could release faculty to spend more time with small groups. Also, from a cost-effectiveness standpoint, cooperative use of television for basic courses makes good economic sense. There has been exchange of such television materials as a result. Success of this effort depends on the delicate relations between the Central Educational Communications Administration, the campus learning centers, and the campus academic staff. SUNY is not moving towards a network for actual interconnections between its campuses.¹

A Proposed Educational Information System for the State of Michigan²

Assumptions, rationale, structure, personnel, and physical requirements for a state-wide educational information system were investigated in this study. The existing needs and resource status of educational information in Michigan are determined, and a physical organizational network which should provide informational services to educators is specified. The needs for a multi-level information system, interpersonal communication, and designing information products to meet user needs, were considered. A literature search on the subject resulted in a stratified bibliography of 218 items.

¹Perraton, H. D.; Wade, D. A. L.; and Fox, J. W. R. Linking Universities by Technology (Cambridge: National Extension College, 1969), p. 83.

²Grimes, George H. A Proposed Educational Information System for the State of Michigan (Lansing, Michigan: Michigan State Department of Education, 1969), p. 220.

A New England Land-Grant Network: A Study
of the Feasibility of Establishing Educational Information Links
between Six Land-Grant Universities in New England¹

This study sought to identify the physical facilities needed to connect the six New England land-grant universities. It sought to determine potential uses, costs, personnel requirements, flexibility desired, and compatibility. It was concerned with telephone, existing microwave, radio, computer, and other communications capabilities including the Eastern Educational Television Network. It considered a main trunk microwave relay system from Washington, D. C. to Montreal. It included study of the New England Library Information Network, a shared data processing system for Vermont hospitals, the proposed Agricultural Network of the National Agricultural Library, and the Proposed University Information Technology Corporation involving Harvard and the Massachusetts Institute of Technology.

Universities Intercommunication: The Nine Universities'
Research Project--Final Report²

This report explores the present state of closed-circuit television and video tape recording facilities at nine Universities in Great Britain. It discusses various means for developing a CCTV network and estimates the probable costs involved. It discusses the uses of such a system concluding with recommendations and proposals for its development.

¹Bardwell, John D. A New England Land-Grant Network: A Study of the Feasibility of Establishing Educational Information Links Between the Six Land-Grant Universities in New England (Durham, New Hampshire: New England Center for Continuing Education, 1968), p. 71

²Jackson, Brian, ed., University Intercommunications: The Nine University Research Project--Final Report (Cambridge: National Extension College, 1966), p. 92.

A State Communication System for Nebraska: An
Independent Telephone Company Story¹

This paper describes the development of a communication network service for the State of Nebraska. It started with a state-wide microwave network to provide ETV broadcast coverage to the state. It analyzes the role of the Nebraska Independent Telephone Industry.

A committee was appointed by the Governor of Nebraska to study the communication problems of the state. The Nebraska Legislature in 1967 created a new telecommunications division within the Department of Administrative Services, charged with the responsibility of coordination and administration of all state communications, except educational television. A general plan was developed for a separate and dedicated state-wide communications system capable of transmission of radio signals (voice, telemetry, control circuits, wideband data transmission, facsimile, etc.). At the time of this report, the ETV service and general communications system were not part of a coordinated system.

Inter-institutional Teaching by Television in the Oregon
State System of Higher Education²

The inter-institutional teaching experiment described, demonstrates that faculties of several institutions of higher learning may work together in a cooperative project for improvement in college teaching. Although this cooperation is a new and complex field in educational administration, it is highly useful.

¹Davis, Donn E. A State Communication System for Nebraska: An Independent Telephone Company Story (Lincoln, Nebraska: Consolidated Communications Corporation), p. 14

²Starlin, Glenn and John E. Lallas. Inter-institutional Teaching by Television in the Oregon State System of Higher Education (Eugene, Oregon: Oregon State System of Higher Education, 1969), p. 95.

There seemed to be many different attitudes of students towards television teaching, ranging from strong approval to strong opposition. In general, students indicated no opposition to the idea of inter-institutional television instruction. After exposure to these courses, some students indicated a preference for the televised course over the conventionally taught course. There was some concern over the loss of personal interaction with the professor, and over the inability to ask questions in class, but most attitudes toward television teaching seemed to be based on the same factors of like or dislike which determined student attitudes toward regular classroom instruction. The significant finding seemed to be that students will accept and can react favorably to television courses which are taught by professors on campuses other than the one in which the student is in residence.

Faculty members indicated some reluctance toward television teaching, but tended to agree that experimentation should be carried out in television to determine its potential as an educational tool. They felt lower division, elementary, or beginning courses, with large enrollments and many sections, were most acceptable for inter-institutional instruction and registered more willingness to accept this type and level of courses by television than more specialized upper division courses.

Organization of the Study

The first task of the Committee appointed by Dr. Beasley to coordinate a study of the proposed "multi-purpose communications network," was to identify and define the problem areas to be studied. (See Appendix, Exhibit D) It then sought to formulate a plan of organization for attacking these problems. The plan that evolved called for the establishment of seven subcommittees, with each committee given specific tasks in a statement of mandates. The seven subcommittees and their chairmen were as follows:

- Academic Subcommittee:
Richard F. Tinder, Chairman
- Continuing Education/Extension Subcommittee:
Norman A. Braden, Chairman
- Medical Subcommittee: (later called Health-Sciences)
Hilda B. Roberts, Co-chairman
Keith R. Campbell, Co-chairman
- Library Subcommittee;
Gerald R. Brong, Chairman
- Community College Subcommittee:
William H. Crawford, Chairman
- Administrative Subcommittee:
John A. Davis, Chairman
- Faculty Rights Subcommittee:
Walter A. Becker, Chairman

In all cases, subcommittee chairmen were asked to seek broad involvement and interaction with appropriate persons associated with their areas of concern.

As each subcommittee completed their study, the chairmen prepared a summary statement of the committee findings, and submitted their work to the Coordinating Committee. It was the responsibility of the Coordinating Committee to evaluate the information of these reports, and along with information gathered in their own study, prepare a final report with recommendations.

In the preparation of the final recommendations of this study, working papers were developed and the chairmen of the various subcommittees were invited to review, criticize, and/or add their comments to the proposed recommendations. The study was then finalized and was submitted to Dr. Beasley as the Committee Report.

Weaknesses and Strengths of the Study

It has taken approximately fourteen months to complete this study since the formation of the original committee in March 1970. During that period of time a great many individuals and departments have been involved with various aspects of the study. Considerable organization was necessary to ensure that all interests were acquainted with the potentials of a microwave network and that each individual had the opportunity to comment. Following are some of the weaknesses and strengths of the study as seen by the committee.

Weaknesses

1. For a study of this magnitude it is probable that a longer period of time would have permitted more solid contributions. This is not to say that a longer period of time would have made the outcome of the study noticeably different but it would have permitted deeper consideration by more potential users. The factor of time also was a weakness when one considers that everyone asked to serve on the main committee or the many subcommittees was already committed to full-time assignments and of necessity made their particular contributions as an additional effort.
2. Partly because of time problems but also because of the subject matter, it was often very difficult to communicate the potential system adequately to the many persons who were asked to make some judgment on the subject. To the best of our knowledge, there is no other network in being such as was contemplated, and we felt we were for the most part breaking new ground in describing what interests the network could serve and how it might be utilized. Because of its newness and resistance from some faculty to what seemed to be a great departure from customary teaching methods, it seems reasonable to observe that opinions were occasionally formed at least partly on the basis of resistance to change. Obviously this is difficult to evaluate but must be considered a weakness because of our problem in communicating an understanding of the nature of the subject when many of the recipients who were asked for contributions and evaluations had never had the opportunity to utilize comparable electronics communications devices.
3. The committee experienced relatively poor communications with most community colleges, several of whom expressed apprehension that the University was planning an activity which they felt would complicate their mandate in extension work. The opinion was also expressed by a few that if they joined in the study, they would eventually be expected to contribute funds from their limited budgets. There did seem to be agreement from some faculty in community colleges that an opportunity to exchange classroom experiences with other community

colleges or even other four-year colleges and universities would be most welcome and a step in the right direction; but, in the overall, communications with community colleges could have been more effective.

4. A review of the literature has indicated that one or two similar studies have been made. If time and personnel had permitted, it is probable that a deeper review of such studies in progress or completed might have provided insight to some of the problems which were encountered.

Strengths

1. We felt it was a plus factor to have had some experience and enthusiasm within the Audio-Visual Center prior to the start of this study. The Center had been active in an earlier Telecommunications Workshop and personnel training, and has several individuals on the staff who are particularly interested in this kind of innovation.
2. There was a very broad involvement of campus personnel in this study. Every academic department was briefed on the proposed plan and was asked to react to its feasibility and use. All other non-academic units that were considered as possible users were given the same opportunity. It is fair to say that a wide spectrum of the university community was contacted and contributed to this study.
3. The fact that there was early involvement, interest, support, and agreement in principle from the Department of General Administration in the state capitol at Olympia was a plus factor. Mr. Larry Mitchell, Supervisor of Communications for General Administration was not only consulted but kept fully advised of our progress and plans. This was done with the view that if such a network ever came into being, it would probably fall to this state agency to administer and operate. Consultation with other state agencies including the Office of Program Planning and Fiscal Management, LSCA Title 3 State Advisory Council on Libraries, Washington State Library, and the Joint Legislative Committee on Education (specifically related to the Library Mini-Network proposal), has elicited the interest and support of many other potential users of a state-wide communications network.
4. The steady and helpful involvement of the State Library and the Library Services and Construction Act Title 3 State Advisory Council on Libraries in our plans and discussions was most helpful, particularly in planning for possible use of sidebands and facsimile transmissions. It was recognized that the developing Washington Library Network would have an almost certain use for such a network facility. The Library system has already accomplished much study and research on the use of computers and data transmission for inter-library use and would undoubtedly be one of the first users for a state-wide system.
5. The fact that an effort was made early in the study to involve appropriate planners from the University of Washington must be regarded as

a plus factor even though a minimal amount of joint effort or planning resulted. There was some involvement and the recognition that as the largest university in the state with its vast resources and close proximity to many other agencies and community colleges in the Puget Sound area, the University of Washington should eventually be a most important part of any state-wide network.

6. Finally, the fact that from the very beginning, the concept of focusing on a plan which would serve the entire state has to be considered as a strength. Such a concept kept the study from becoming a unilateral, self-serving apparatus and permitted the long-term view of growth, multi-purpose use, and the eventual widening of the proposed state-wide communications capability to other states and the entire nation. This was not a parochial study. From the beginning WSU was recognized as a possible starting place for the establishment of a mini-network which would gradually involve a variety of users, and which would eventually require some kind of state funding or subsidy. It was an early committee decision that any recommended network which grew out of this study should be so planned that it would serve initially as an experiment in communications capabilities and from there grow as required into a vehicle which would serve every appropriate state and citizen need. The committee feels this focus and concept to be one of the greatest strengths of this study.

CHAPTER 2

SUMMARY STATEMENT OF THE STUDY REPORTS AND RECOMMENDATIONS

Summary Statement of the Study Reports

It is not the purpose here to summarize each of the subcommittee reports, but to present impressions of significant information from the reports.

Uniqueness of the Proposed Telecommunications Network

The establishment of a communications network is not in and of itself unusual or unique. Thousands of networks of various sizes and functions exist around the world. A great number of studies on networking have been conducted by various educational units throughout the U.S., and many communication networks have been implemented serving various needs of higher education. That which is unique about this proposed telecommunications network is the broadness of its concept in terms of meeting the communication needs of a wide range of user groups and providing such groups of users with multiple types of communication capabilities. Most existing networks, serving higher education needs, tend to have a narrow range of users, and a limited type of communication capability. A network system as expandable and flexible as the one proposed is not as yet common.

Interest in the Proposed Network System

There were highly enthusiastic and highly skeptical expressions of interest in the proposed network, but most persons responding seemed to reflect a moderate, willingness-to-explore further, attitude. Certainly there was very adequate interest and support expressed to warrant continued progress towards

the establishment of a communications network similar to that which is being proposed.

Beginning Estimated Use

From the standpoint of WSU's beginning use of the proposed network, the total hours of use per week identified by various users was beyond expectation. Many individual responders seemed quite cautious and conservative in their willingness to commit themselves to an estimated number of hours of use per week, assuming the proposed network were to come into existence. In spite of this reticence specific television uses on the system were identified as follows:

<u>Subcommittee</u>	<u>Hours/Week Use Identified</u>
Academic	115 - 211
Continuing Education/Extension	10 - 15
Health Sciences	3
Library*
Community Colleges*
Total	128 - 226

*Indicates significant anticipated use but could not provide an estimate of specific hours per week.

While the Academic Subcommittee indicated a sizeable predicted use, several respondents predicted their college or department would be a significant user of such a system, but they could not provide any specific number of hours per week use. With these things in mind, the hours per week predicted would seem to be quite conservative.

Assuming a beginning television use of an estimated average of 177 hours per week, a minimum of two duplex broadband dedicated channels would be required to handle WSU traffic alone.

Geographical Services Areas

It should be noted that the projected use was first based upon network service to the geographical locations of Pullman, Richland, Walla Walla, Pasco, Prosser, and Spokane. During the study it became evident that a high priority existed for a cross-state communications capability of the type proposed in the study. A large number of respondents placed a high priority on communication with the Seattle area and other points on the west side of the state. For example, several areas such as Veterinary Medicine, Engineering, Nursing, and Pharmacy predicted significantly greater use if the Seattle area were a part of the network.

Identified Geographical Priorities

Priorities on geographical locations for beginning service of the proposed network were identified in the subcommittee reports as Pullman to:

1st Priority	Seattle Area
2nd Priority	Spokane Area
3rd Priority	Tri-Cities Area
4th Priority	Communities with Community Colleges
5th Priority	Communities with four-year colleges

Other locations listed, and which were of a high priority to at least one college or unit were Prosser, Puyallup, Olympia, Tacoma, and Moscow, Idaho.

The Seattle area was listed specifically as a first priority in seven reports, and as a second priority in three additional reports. It would seem that a change should be made in the proposed geographic design of a beginning telecommunications network, to establish a cross-state system as the first priority. This could significantly affect utilization of the system.

Problems in Estimating Costs

Identification of costs involved in utilization of the proposed system was very difficult for respondents due to limited information or lack of formulas available to them on which to base costs. Figures given were often referred to as guestimates.

Financing the Network

Suggestions by some respondents as to ways of financing such a system indicated it was generally felt the whole matter was a budgeting problem to be handled by the Administration and Board of Regents rather than individual colleges or departments.

The seeking of outside funding in the way of grants, tuition charges for off-campus instructional activity, and savings in travel expenses all were mentioned by respondents, as ways of helping to finance the operation of such a proposed network.

Cost Information from Potential Vendors

Estimated cost figures have been provided by two potential vendors, the Microwave Transmission Corporation and General Telephone Company of the Northwest, for both the early proposed geographic service areas as well as for the beginning cross-state microwave service connecting Spokane, Pullman, Richland, and Seattle.

Pricing includes broadband dedicated channels for use of one-way and two-way television, with maximum flexible switching, twenty-four hour dedicated use and with complete maintenance service provided. It also included the availability of sideband channels or independent Telpak channels which can be used simultaneously for voice, data, teletype, or facsimile communication. Pricing

does not include accessory associated communication hardware equipment, nor specific multiplexing or special switching capabilities that might be desired.

The following are estimated costs for a beginning cross-state network connecting Spokane, Pullman, Richland and Seattle:

Microwave Transmission Corporation

	<u>Per Month Charge</u>	<u>Per Year Charge</u>
1st duplex channel, including 12 duplex sideband channels	\$ 18,040.00	\$ 216,480.00
2nd duplex channel, including 12 duplex sideband channels	9,725.00	116,700.00
	<hr/>	<hr/>
Total for two duplex cross-state channels	\$ 27,765.00	\$ 333,180.00

General Telephone of the Northwest

	<u>Per Month Charge</u>	<u>Per Year Charge</u>
1st duplex channel, video only	\$ 15,000.00	\$ 180,000.00
Along with use of 12 duplex voice channels (Telpak)	5,000.00	60,000.00
72 channel switcher	1,800.00	21,600.00
2nd duplex channel, video only	8,000.00	96,000.00
12 duplex voice channels (Telpak)	5,000.00	60,000.00
	<hr/>	<hr/>
Totals for two duplex channel video service and 24 duplex voice channels (Telpak)	\$ 34,800.00	\$ 417,600.00

NOTE: Cost estimates for the earlier proposed geographic areas were listed in their formal proposals, submitted by the two vendors.

Based upon a potential 24 hour per day use, 365 days per year, the cost per hour for all uses of the total system would be:

Microwave Transmission Corporation	\$ 38.00 per hour*
General Telephone of the Northwest	46.50 per hour (including Telpak)

*There would be additional charges made by MTC if the system were to provide the capability for using campus telephones to dial on and off line to all geographic areas served by the network.

Examples given in the Administrative Subcommittee report would seem to indicate that with the multiple uses possible on the telecommunications network system it could be a cost effective and justifiable operation. With multiple users and multiple simultaneous uses possible on the system, the unit cost per use is potentially quite reasonable as measured against present charges made for similar services by telephone companies and common carriers.

Interest Outside of WSU in the Development of a Telecommunications Network

1. The study committee established early contact with the State Department of General Administration in Olympia and through Mr. Larry Mitchell, Supervisor of Communications, sought to keep this department of State government fully informed on progress. The study committee sought to confirm that the concepts being considered for a state telecommunications network were acceptable and consistent with state planning philosophy and policies. Mr. Mitchell has made several trips to Pullman to meet with various planning groups and has indicated that General Administration Officials are very interested and supportive to the efforts of this study.

2. Officials of the Washington State Library and the Washington State Advisory Council on Libraries have expressed very great interest in the proposed telecommunication network system under study at WSU, and have indicated the concepts being developed are fully in line with their needs in the development of their network requirements throughout the state.

Mr. Gerald Brong, in his Library Subcommittee report, provides more detailed information concerning the Washington Library network study and significant recent developments. Mr. Brong was recently appointed Chairman of the Washington State Advisory Council on Libraries.

Mr. J. W. Hardie of the WSU Audio-Visual Center and Chairman of the Coordinating Committee for this WSU study, has recently been asked to serve as Chairman of the Washington State Advisory Council on Libraries' Network Services Task Force.

The potential for cooperative planning and coordination between WSU and the State's libraries concerning a state telecommunications network seems to be excellent.

3. The Administration of the Center for Graduate Study in Richland has shown considerable interest and support for the development of the proposed network. Several informal meetings have been held with center representatives over the past fourteen months concerning the network. The Administration of the Center has undertaken its own study of ways it might benefit and use such a communication network. Excellent cooperation has always been given.

4. The Chairman of the Community College Subcommittee did not find a high degree of interest among some community college administrators. In spite of the initial lack of response, it is the opinion of the study committee that should a state communications network begin to be given serious consideration and attention, the community colleges would become vitally interested and willing to cooperate.

5. Mr. L. W. Hevly, Director of Closed-circuit Television Services at the University of Washington, has served as an ex-officio member of this study committee. He has made two trips to the WSU campus in connection with the study and has taken information concerning this study to the Administration of the University of Washington and encouraged steps be taken for a similar study to be done at their campus. A feasibility study was made at the University of Washington in 1967-68 to determine the cost of microwave network services interconnecting nineteen communities with that campus by television. Cost figures at that time, for the system proposed, were prohibitive and the idea was dropped.

Mr. Hevly feels that if official steps are made to undertake the development of a state telecommunications network, the University of Washington would be greatly interested.

6. The Health Sciences area has demonstrated great interest and enthusiasm. Several meetings were held in Spokane with representatives of all the major hospitals, the coordinator of Washington/Alaska Regional Medical Program, and others in leadership roles in the Health Sciences fields. Considerable discussion was held as to ways of developing a telecommunications subsystem network, interconnecting hospitals in Spokane that would also be compatible with a state network. Many applications and uses were identified as to the benefits of such a state network, particularly if the network included the University of Washington Health Science Center.

7. Washington State University and the University of Washington are jointly negotiating with the National Science Foundation for the establishing of a bibliographic data bank providing bibliographic information on science research activities in all major fields. This library/computer service will require a data link between the two Universities. The proposed network could provide this capability.

Rationale and Assumptions for Recommendations

1. It is not economically feasible for Washington State University to plan, develop, and operate its own private telecommunications network of the type considered in this study.

2. It is economically and technically feasible for WSU to cooperatively participate with other potential state users in the planning, development, and operation of such a network.

3. To be feasible, a state telecommunications network with the capabilities outlined in this study must provide for the needs of a wide range of users, and the capability of multiple simultaneous uses.

4. It seems evident that the planning of such a network must emphasize an evolutionary development. The first phase should be of a size and complexity suited for training persons in the uses of such a system, developing of operating procedures, testing experimental uses and applications, and determining needed modifications in the system's design.

5. Obviously, a state telecommunications network system should be designed for compatibility for eventual interconnection with regional, national, and international communication networks, as well as smaller subsystems.

6. It would seem that special funding sources must be located to help subsidize the beginning stages of such a state telecommunications network.

7. Washington State University is in a unique position to play a responsible role in the development of a state telecommunication network because:

- a. As a Land-Grant College, it has traditional service functions to the total geographic areas of the state. The fulfilling of these functions has been complicated by the remoteness of its geographic location.
- b. This University has already assumed a leadership role in telecommunications.
- c. This University has the basic facilities and qualified personnel and the University can provide the leadership in planning, training, operational experimentation and development, and coordination.

8. There are a number of ways in which a telecommunications network, as proposed, may offset present expenditures through changes in present methods of operation, and thereby provide a significant means for helping to cover the cost of such a system.

9. It would be unwise for the state to become engaged in constructing, operating, and maintaining its own telecommunications network facilities, but should depend upon the communication industry to provide such services.

Recommendations

As a result of this study the committee feels that a state-wide multi-purpose telecommunications network system is not only technically feasible, but will become imperative in a relatively short time. The need for an exchange of information among various educational units, state agencies, and citizens' groups has grown to the point that a variety of small, uncoordinated networks are now in the planning stages. Some of these, if developed, would create separate and sizeable duplicative expense to the state. Such multiple small networks may soon be realized unless alternative means for meeting communications requirements are developed. The multi-purpose telecommunications network system as proposed could provide that alternative and in time could be interfaced with other state and/or national telecommunications network systems.

The committee is convinced that a basic state-wide network connecting Spokane, Pullman, Richland, and Seattle will soon be a necessity and strongly recommends that steps be taken to develop such a network as soon as possible. Because of the time factors involved and the complexity of establishing an operational state-wide network at an early date, the committee recommends that Washington State University take the initiative by establishing on its campus a pilot or prototype system to serve as a model and first phase in the development of a state-wide system.

To accomplish this, the committee recommends:

1. That immediate steps be taken by the University to establish an on-campus prototype of a basic cross-state telecommunications system with similar capabilities. Such a prototype system would function to:
 - a. determine the actual performance capabilities of such a system;
 - b. identify refinements that should be made in the technical specifications prior to the development of a large scale network;
 - c. develop an effective program for training faculty and staff in the various uses of the telecommunications network, and conduct short courses and training programs in telecommunications operation for personnel from other agencies of state government. Such

short courses and training programs would be designed to train personnel for use of such a state network as it becomes operational. Such programs could be offered for the benefit of persons outside of state government interested in such training experiences.

- d. develop workable operational procedures;
- e. determine staffing requirements in operating telecommunications services;
- f. test as many potential uses of the system as possible, to evaluate results and determine cost effectiveness; and
- g. to determine specific ways the network might be used in continuing education for extension work of the University.

2. That appropriate personnel be designated to plan, write, and submit proposals to various potential sources for funding for the proposed beginning phases of a state network, including the prototype operation.

3. That a program be planned and developed to inform appropriate Washington State Legislative Committees, the Governor's Office, the Department of General Administration, and the Office of Program Planning and Fiscal Management relative to the activities undertaken by WSU, and also that members of the Washington Congressional delegation be fully informed regarding any developments in program action relative to a state telecommunications network.

4. Assuming the prototype system has proven successful at the end of six months of operation, that immediate steps be taken to implement a cross-state multi-purpose telecommunications network connecting Spokane, Pullman Richland, and Seattle. Olympia should be added as soon as practicable after the cross-state operation is functioning satisfactorily.

5. That administrative control units be established to supervise and coordinate the development of a cross-state communications network and the development of a prototype system at WSU. It is suggested that the control unit for the development of the state-wide network include two members each from WSU, the University of Washington, and State Government in Olympia; the proposed

members being:

Mr. James W. Hardie, WSU: Chairman
 Mr. J. Reginald Miller, WSU
 Mr. Leon W. Hevly, University of Washington
 Prof. Raymond Schneider, University of Washington
 Mr. Lawrence V. Mitchell, Jr., Department of General
 Administration, Olympia
 Mr. Harry Baird, Office of Program Planning and Fiscal
 Management, Olympia

Other resource persons may be added on an ad hoc basis as desired or necessary. It seems imperative that this control unit be named prior to decisions regarding the establishment of a state-wide network in order to ensure its development in an orderly and systematic fashion. It would be the responsibility of such a control unit to plan, coordinate, communicate with, and involve all the other appropriate offices and agencies of state government in the evolutionary development of the system.

It is suggested that the administrative control unit for the prototype network at WSU include in its membership the following personnel:

Mr. James W. Hardie, Chairman
 Mr. Gerald R. Brong
 Mr. William H. Knight
 Mr. J. Reginald Miller
 Dr. William E. Walden

This unit to be charged with the responsibility for coordinating the development of a prototype system at WSU in an orderly and effective procedure with the Audio-Visual Center responsible for supervising all operational functions.

For purposes of unified planning and control it is suggested that both administrative units report to a representative of the central administration at Washington State University on an interim basis, or until such time as the growth of the cross-state network makes it desirable to place administrative direction and supervision under a designated state agency which could more properly represent a variety of users.

6. That Washington State University continue to provide leadership in telecommunications development.

CHAPTER 3

SUBCOMMITTEE SUMMARY REPORTS

ACADEMIC SUBCOMMITTEE

Richard F. Tinder, Chairman

MEMORANDUM

TO: Richard F. Tinder, Chairman
Sub-Committee on Academic Departments
for a Multi-Purpose Communications System

FROM: James W. Hardie

DATE: April 23, 1970

SUBJECT: Mandate for Sub-Committee Study

I am pleased you could accept the chairmanship for this important study area. There have been many expressions of interest on the part of faculty in several different departments. Some have been very enthusiastic about the proposed use of a microwave network capability while others have shown only lukewarm interest. We would like your committee to conduct a thorough survey of the expressions from departments (attached), as well as other departments which you feel might utilize such a network. We would like to know the degree of interest and some evidence of faculty commitment; the expected hours of use for each academic area; the frequency of use; kind of credit required; degree of utilization of computer services; extra costs in each area for teaching and production; sources of income broken down into approximate amounts from each source; geographic areas on network to be served by each department; and other related facts.

If the University is to make a substantial commitment to the establishment of the proposed network, it can do so only on the basis of a thorough understanding of its uses, needs, and funding.

I would very much appreciate receiving your report by June 1 in order to give our committee time to finalize its report to Dr. Beasley by July 1.

J. Reginald Miller, Arnold Gallegos, and I make up the coordinating committee for conducting this depth study analysis. We want you to know that we stand ready to assist and work with you in any aspect of your Sub-Committee work. You are free to select other committee members of your choice.

CHAPTER 3

SUBCOMMITTEE SUMMARY REPORTS

Academic Subcommittee: Richard F. Tinder, Chairman

Committee Members

Richard F. Tinder, Associate Professor, Metallurgy: Chairman
Richard A. Baker, Associate Professor, Mechanical Engineering
Sherman C. Lowell, Professor, Physics and Information Science
Ovid Bay, Editor, Cooperative Extension Service
Keith R. Campbell, Assistant Professor, Pharmacy
Robert Grunewald, Associate Professor, Education
Marshall Hamilton, Associate Professor, Child and Family Studies
Obert C. Henderson, Assistant Professor, Business Administration
Lavon Koger, Associate Professor, Veterinary Medicine and Surgery
Randell Kleinhesselink, Assistant Professor, Psychology
Harlan Stensaas, Assistant Professor, Communications

General Attitudes

College of Engineering

Richard A. Baker, coordinator of the study for the College of Engineering, reported that there were three factors that would affect the use of the proposed communications system for instructional applications:

1. costs, and who pays the bills
2. cooperation of the community colleges
3. cooperation of the Graduate School in allowing courses to be offered over the system for resident instruction credit.

Architecture and Civil Engineering Departments indicated a high priority in having the system connect to the University of Washington, but the rest of the departments were either neutral or expressed concern that the inclusion of the University of Washington might pose a threat to their own graduate programs.

Bill Knight, Director of Engineering Extension Services, reported the reaction of the Engineering faculty to be varied.

Many think such a program can be successful, and can expand considerably once it is established and operating. Others feel their discipline of instruction would not be too successful unless the system were to be state-wide to include the industrial areas of the coast. Such a University-wide TV network and the associated educational program to go with it is going to need tremendous administrative approval and support at the top. Do we have that type of support . . . and/or the philosophy to sustain it here at WSU? A Land-Grant University should certainly be the proper place to start if we can do it.

Departments of Chemistry, Computer
Science, Geology, Mathematics,
Physics, and Zoology

S. C. Lowell summarized information gained from the above listed departments. He states that there simply was not enough information provided for the departments, particularly about financial support, to provide good feedback information. He states that the above listed departments seemed to indicate that their extent of interest in using the proposed communications system depends on whether the system would include such locations as Moscow, Idaho (University of Idaho), Seattle, as well as Richland and Spokane. It was also expressed that the system and program would have to be subsidized for a "considerable" period of time, and there were fears that such might be at the expense of other programs, or that faculty loads would be increased.

Positive comments were given that it would:

1. help to make a regional computer center of WSU;
2. eliminate some travel and provide a means for better regional planning among departments, research groups, and professional societies; and
3. provide enrichment of on-campus courses through the ability to electronically bring guest lecturers to the campus.

In a summarizing statement, Lowell concludes that a general feeling was expressed from the various departments, that WSU must move firmly in the direction of having a multi-purpose communications system, and that the responsibility for doing so rests with the Regents and Administration. It was assumed

that if they accept this responsibility, they would also find ways to provide the money and staff to make it work.

E. E. Donaldson, Chairman of the Physics Department, summarized reactions of his department as follows:

It appears that the system would be vital for any university department which sponsors a department at the Joint Center. It is hard to believe that simply traveling back and forth between Pullman and Richland will provide the close interaction desirable.

He also stated that entire courses might be taught simultaneously at the Joint Center for Graduate Study and WSU, with origination of the course possible at either end. (He qualified this by stating that only one faculty member seemed eager to try this at this time.) Donaldson suggested that possibly the system's greatest potential and usefulness would be in course enrichment in bringing guest lecturers to campus by this system. He also pointed out that significant questions were raised by faculty members about the true capabilities and potential of such a system, and wanted to know of the success or failures experienced elsewhere with such systems.

J. W. Mills, Chairman of the Department of Geology, reported that this department could not foresee any need for such a communications system.

Calvin T. Long, Chairman of the Mathematics Department, reported that there are a great number of possible uses for such a communications network provided the University desires to move towards an enlarged extension program. Long identified potential extension course offerings that could be offered at Spokane, Walla Walla, and Richland. He also cited uses of the system for meetings and conferences, and in-service training courses for elementary and secondary math teachers. He pointed out that at present, the Mathematics Department treats extension work with "benign neglect" due to the tremendous drain on staff time, and that it is not encouraged as a professional obligation. He describes the climate as such that those who engage in extension

work are considered "moonlighters," and in some cases this even jeopardizes their professional careers.

Long indicated that should the administration wish to go into extension work with a "vengeance," it will require appropriate staff positions, financing, rewards, and encouragement. If this happened, the multi-purpose communications network would probably be used extensively by the Mathematics Department. With no change in extension policy, use would be quite limited. Therefore, as far as the Mathematics Department is concerned, use of the communications network is tied directly to University policy and support of extension programs.

Long expressed the personal view that higher education's future includes greatly enlarged emphasis upon extension work, adult education, remote facilities, and a library-computer-communications center physically distant from most or all of the student body. "Such a major shift in the traditional classroom approach to education must come from major decisions and commitment on the part of the Administration, not from expensive and inefficient dabbling at the department level."

C. M. Stevens, Chairman of the Chemistry Department, indicates there is only mild interest on the part of faculty in his department for the proposed communications network. He sees two immediate, and significant uses for the system:

1. joint graduate instructional offerings with the Center for Graduate Study in Richland, and
2. joint offerings of advanced topic graduate courses in chemistry with the University of Idaho in Moscow.

Stevens indicates that all initial use of such a system for instructional applications would be experimental as far as the Chemistry Department is concerned, until such use proved satisfactory. He expressed the idea that the

economic squeeze may help bring about utilization of such a system, particularly in efforts with the Graduate Center in Richland. Stevens expressed the personal view that the University can't afford to stick to conventional modes of operation, implying support for this development.

William Walden, reporting for the Computer Center, indicated the system would have obvious advantages in helping to meet their obligation to the Center for Graduate Study in Richland, but indicated time would be needed to adjust to instructional methods using this medium. It was also felt the program would need to be subsidized for some time.

R. J. Adkins, reporting for the Department of Zoology, indicated that with only a limited time to consider the possibilities of the proposed system, Zoology sees potential use of the system for:

1. sharing visiting lecturers;
2. research discussions among physiologists, anatomists, etc.;
3. demonstrations;
4. presentations describing professional programs; and
5. interviews for professional placement opportunities.

College of Pharmacy

R. Keith Campbell, reporting for the faculty of the College of Pharmacy, indicated great interest and enthusiasm exists in this College for the proposed communications network. Pharmacy envisions use of the system for academic applications as follows:

1. to support the clinical clerkship in Spokane;
2. to provide access between the computer center at Holy Family Hospital in Spokane and the College of Pharmacy;
3. voice communications with various hospitals at locations served;
4. opportunity to develop experimental computer programs for drug information service and patient records;

5. conferences, lectures, and seminars between faculty and graduate students of the University of Washington College of Pharmacy and School of Medicine, and the WSU College of Pharmacy; and
6. recruitment of health science students from high schools and community colleges.

Campbell reported that the WSU College of Pharmacy is very desirous of utilizing such a system, and they have already taken the steps to include funding support in their application for a grant from the National Institute of Health. He closes his report with the statement, "It is my opinion that the benefits greatly outweigh the costs and the system should be implemented as soon as possible."

Social Science Departments

Melvin L. De Fleur, Chairman of the Sociology Department, indicated they are finding it difficult to provide proper service to students already on campus, and therefore, are not in a position to develop new programs that might make use of such a network. He did say that interest was expressed in the possibility of experimenting with the system should it be developed.

Ron T. Halfmoon, reporting for the Native American Studies Program, indicates that he foresees a need in the near future for increased flexibility in communication systems, and departments such as his could use such a system to conduct discussions and conferences relevant to Indian Affairs held in various parts of the state.

R. Littlewood, reporting for the Anthropology Department, noted the fact that the faculty of this department had only a little time to discuss the implications of such a communications system. Nevertheless, several faculty members showed very strong interest, and skepticism was expressed by none of the faculty. He stated that Anthropology sees potential use of the system for instructional applications particularly for continuing education. Particular interest was expressed in offering such instruction to interested persons in

Spokane. The faculty of this department indicated they see great benefit in undergraduate and graduate programs in bringing to campus electronically, resource personnel from the Seattle area as well as other parts of the state. Littlewood stated that the Anthropology Department has been greatly limited in having specialists from other faculties as lecturers. He pointed out that through a rational system of cooperation, it would be possible to obviate the necessity of duplication of facilities and faculty at the four-year colleges and university level. The Anthropology faculty also felt that seminars and classes dealing with regional and ethnic groups would be possible over the system and that such a system would allow research workers a better means of communication, plus improve the means for consultations on technical matters such as geology, palynology, soils, comparative osteology, etc. It was also stated that it would be quite helpful to have facsimile and data facilities to help in the cumbersome interlibrary loan procedures.

Thor Swanson, reporting for the Political Science Department, pointed out that important variables made it impossible for this department to answer the questions of the questionnaire in a specific way relative to use, staff needs, or costs, but it was generally felt that such a system could generally contribute to the productivity of the department in the following ways:

1. enlarge the range of teaching and lecturing of department faculty,
2. assist in research, and
3. provide a means of bringing public officials and others from distant points to the classrooms in Pullman.

Raymond Muse, Chairman of the Department of History, reported the Department of History discussed this project at some length, and while it was difficult to arrive at specific predicted hours of use, the department was quite willing to make a commitment to certain types of uses:

1. undergraduate instruction and perhaps graduate instruction on a limited basis;
2. continuing education;
3. use for better communications, particularly with the community colleges;
4. facsimile transmission of documents and library materials;
5. much wider use of visiting lecturers.

Roger T. Davis reported for the Department of Psychology that it was not possible to provide detailed answers to the questionnaire as to uses, but indicated that if such a network were available the department would make "some" use of it. Psychology courses have been offered both in Spokane and Richland, and could be taught over such a system. Such a system could also provide improved communication with research personnel in Spokane.

A. L. Pasquan, Chairman for the Department of Police Science and Administration, reported that the general consensus by faculty of this department indicated that the type of communications network proposed would eventually develop into a state-wide system. There were mixed opinions among faculty as to the possibility of using such a system as a means of partially alleviating the problem of transfer credits, and offering educational institutes for continuing education. Some faculty expressed concern that use of such a system would present a loss in inter-relationships between student and professor.

College of Education

Robert N. Grunewald coordinated the study within the College of Education and reported that only twenty-four (60%) of the faculty returned the questionnaire that had been circulated concerning the proposed communications network system. Of these, three were negative responses, four were neutral, eleven were positive but with some caution expressed, and six were very enthusiastic in their responses.

In general, the faculty in the vocational-technical area, community college areas, and some in physical education were the most enthusiastic about such a system. According to Grunewald, "If only a few of the possibilities discussed were realized, the Department of Education would have to be counted as a strong advocate of the system."

Caution was also voiced by Grunewald as he pointed out that a significant number of faculty did not see enough value in the system, or did not know enough about it, to return the questionnaires. He also pointed out that all responses were based upon the assumption that finance and the priority in relation to other needs was not a factor. If funding were in competition with other needs, respondents did not necessarily give this a high priority at this time.

"Proceed with caution" seemed to be the recommendation. "In an era in which the demands upon educational institutions are increasing and in which teacher education may be moving toward the districts, contact becomes even more important." In conclusion, Grunewald quoted Dr. Kenneth Hansen relative to the communications network, that it would " . . . contribute to the historic and chartered purpose of Washington State University to serve our clients state-wide through any effective means of disseminating new knowledge."

College of Agriculture

Ovid Bay, in reporting for the College of Agriculture, noted that department chairmen were concerned about having the proposed communications system pay its own way. With the new emphasis on holding the line and even drastic budget cuts, it is difficult to build optimism for this new communications system.

Bay summarized that there is considerable interest in the proposed microwave communications network, but with emphasis upon budget cutting, it

has developed into undesirable timing to ask departments to consider a system they perceive will "cost" them money.

Humanities

Harlan Stensaas, in reporting for the area of the Humanities, states, "It would appear that projected first year use of a multi-purpose communications network by units in Humanities, would be minimal." Total hours of use during the first year are estimated at between 523 hours and 770 hours. The most optimistic estimate of number of courses that might be placed on the system is eight, and half of these are projected by the Department of Speech.

Estimates of additional resources required in order to use the system as projected appear relatively slight. These include possibly three FTE's and about \$2,000.00. But the tone of the reports from departments might indicate that lack of adequate staff and resources tends to discourage projected usage of the system for new ventures.

Stensaas reported that considerable interest was expressed in using the system to "bring the state to Pullman," as opposed to extending the services of the University beyond the campus. A number of units expressed interest in using the system as a means of conveniently and economically bringing resource persons to the campus and as a means of participating in conferences, seminars, and symposia regularly scheduled at distant locations within the state. The need for the system to link with the University of Washington was repeatedly stated.

It was pointed out by Stensaas that there was some indication that units which projected minimal or no initial use of the system might be expected to begin using the system at a later time when pressing current problems have been solved. Specific comments from departments are as follows:

1. Communications: "Extensive use of this system by this department would be contingent upon additional resources being made available."
2. Fine Arts: ". . . when and if we reach the point that we feel satisfied we have our existing program operating at the level we aspire to, there will be some urge to look for new worlds to conquer"
3. Foreign Languages: ". . . off-campus students participating in such courses would, we assume, pay WSU the regular fees. The cost of transmitting the class, therefore, would seem to belong to the University and not to the department."
4. Music: "The audio quality available would have to be a consideration in any decision concerning the use for music courses."
5. Philosophy: "We see genuine value in the Microwave Communications Network. Please do not take the following remarks as anti-technology. Indeed, properly directed, technology is our only hope. Still, there are dangers in the wide-spread use of such a system for instructional purposes. Sometimes technology instead of solving our problems, just puts off the day when we have to face up to them. This system is not the answer to the problem of how we can educate ever-increasing numbers of students, because there is no answer to that problem; we can't. So the sooner we address ourselves to the problem of population control the better, and the better our prospects for success. The effect of our stop-gap efforts, e.g. mass lectures, increasing use of TA's, TV systems, and now the microwave system, is only to de-humanize the educational experience in gradual stages until finally it will become something that neither the students nor the faculty will want to be a part."
6. Speech: "I believe that the system will be used in manners not yet conceived; I think we need to go ahead with it. If departmental participation in costs is to be required, the departmental budgets will need to be revised to provide funding. We cannot withdraw support from other projects in order to support this one especially with as high a cost factor as you list."

College of Veterinary Medicine

D. M. Koger, reporting for Veterinary Medicine, indicated the general attitude expressed by the faculty of this College as follows:

Enthusiastic as to the future when the system involves other veterinary colleges, but skeptical during the developmental stages while the system is limited within the present plan."

College of Economics and Business

Obert Henderson, reporting for Economics and Business, indicated that there would be academic use for the system, but that it would be difficult to

project costs and usages. He feels that such a project must be undertaken primarily as a research project.

College of Home Economics

Marshall Hamilton, in reporting for the College of Home Economics, indicated the following comments from chairmen and faculty members:

So many arrangements remain to be worked out, it is difficult to estimate what uses are possible. Certainly it could supplement instruction, but for my functioning, much would depend on the cooperation of the University of Washington.

It would be interesting to occasionally see other programs which are available to us here, and to have conferences with people across the state.

With budgets so limited, I would not want to see money invested in this system in the near future. There are other needs that should receive priority for some time.

Let's get going and quit studying.

It appears to us that it could make more effective use of faculty time and University facilities.

Members of the Clothing, Interior Design, and Textiles Department noted that their potential use of the system would be influenced by whether or not very large screens could be used. Much of their work requires visual detail not possible on a normal size screen. They saw particularly exciting possibilities at such time as connections with the fashion and design centers of the country (Seattle, San Francisco, New York) could be utilized. The potential of tie-ins with community colleges was also mentioned.

The fact that this College estimated 50 hours per month use of the proposed system seems to indicate a very positive and supportive attitude towards development of such a system.

Comments Made as to the Geographical Priorities
for the Proposed Communications System

Locations mentioned in the reports from the different departments as summarized by Richard A. Baker, are listed as follows:

1. Primary demand is the Tri-Cities area
2. Seattle and University of Washington
3. Spokane
4. Communities where Community Colleges are located

Mechanical Engineering, Electrical Engineering, Architecture, and Chemical Engineering all anticipate offering their sophomore courses either once to twice a year to whatever community college might request it. Graduate level courses (with resident credit) could be taught at Richland, Spokane, Pasco, Wenatchee, Walla Walla, Tacoma, Longview, and Seattle. Architecture envisions teaching courses cooperatively with the University of Washington.

Civil Engineering envisions the opportunity to offer graduate courses for which there is not broad demand, but still needing to be offered. Such courses could be taught from either the University of Washington or WSU to students at both institutions simultaneously. Graduate students located at Richland, Spokane, or elsewhere could be incorporated into a single class because of the type of communications system proposed.

Departments of Chemistry, Computer Science, Geology, Mathematics, Physics, Zoology, and Genetics

S. C. Lowell reports the key geographical locations of major interest to these departments initially are: Moscow, Idaho; Seattle; Richland; Spokane; and eventually state-wide. The Genetics Department expressed primary interest in communicating with the University of Washington.

College of Pharmacy

Primary locations of interest include: Spokane, Seattle, Tri-Cities, Walla Walla, but would hope that eventually the system would reach to all areas of the state.

Social Science Departments

Geographic locations mentioned include: Seattle, Spokane, Richland, and communities where four-year and community colleges are located, with preference given for a state-wide system.

Humanities

All departments that reported favored a state-wide system.

1. Communications: State-wide, especially areas with media concentration
2. Foreign Languages: Eastern Washington primarily, but would value a tie-in with the University of Washington.
3. Philosophy: State-wide, especially the University of Washington and the four state colleges.
4. Speech: Spokane, 50%; Tri-Cities, 15%; Tacoma, 15%; Medical Lake, 10%; Seattle, 5%; Miscellaneous (Cheney, Ellensburg, Bellingham, Yakima, Walla Walla, Wenatchee, etc.), 5%.

College of Agriculture

The geographical areas of most interest to be served by the proposed communications network in the College of Agriculture would be: Prosser, Puyallup, Wenatchee, and communities with community colleges.

College of Education

An overwhelming majority of respondents favoring the development of the system felt that the network eventually should be state-wide. Areas most frequently mentioned were the Tri-Cities and Spokane.

College of Veterinary Medicine

Geographical interest in this college is for a state-wide network with great interest in reaching population centers on the west side of the state: in order of priority--Seattle, Spokane, Tri-Cities.

College of Economics and Business

Off-campus use to various schools in the state is indicated but no

specific geographical locations are mentioned.

College of Home Economics

The four departments of this College were unanimous in desiring a cross-state system with the University of Washington in Seattle, Tacoma, Basin Area, Tri-Cities, and Spokane mentioned specifically. Interest was also expressed for a regional and nation-wide system eventually.

Proposed Uses and Estimated Hours and Frequency of Use of a Proposed Multi-purpose Com- munications System

College of Engineering

1. Undergraduate Use: Mechanical Engineering, Electrical Engineering, Architecture and Chemical Engineering all anticipate they would offer their sophomore course either once or twice a year to any community college requesting them to do so. Chemical Engineering would offer both their sophomore mechanics courses. A rough estimate of time use of the system would require 9 to 18 hours per week.
2. Graduate Use: Assuming the possibility of allowing resident credit
 - a. Mechanical Engineering: Primary demand would be in Richland with some interest in Wenatchee. One or two courses per term.
 - b. Metallurgy: Without resident credit, a course every other term. With resident credit, one or two courses per term between the Graduate Center in Richland and WSU.
 - c. Chemical Engineering: Either one course per term, or one course per year.
 - d. Electrical Engineering: Between one and four courses per term with the Graduate Center in Richland, and possibly some demand from Spokane.
 - e. Architecture: One course per term, plus the possibility of teaching courses cooperatively with the University of Washington.
 - f. Civil Engineering: This department envisions teaching courses cooperatively with the University of Washington. Five courses in Sanitary Engineering plus two other courses each term. Half to originate from WSU.
3. Continuing Education
 - a. Architecture: Three hours per week.

- b. Civil Engineering: One seminar per term with participants in Pullman, Seattle, and Richland, one to three hours per week. There is demand in Olympia for two-day to one-week short courses, average one hour per week.
- c. Electrical Engineering: One course per year, 1 1/2 hours per week on the average--Pullman, Spokane, and Richland.
- d. Agricultural Engineering: An extension course offering every other year to Walla Walla or Ephrata.
- e. Chemical Engineering: Offer extension courses, but number and locations would only be a guess.
- f. Mechanical Engineering: One extension course per year (Spokane).

If resident credit is allowed, the College of Engineering would want to use the system from 40 to 50 credit hours per week. If resident graduate credit is not allowed, it would average approximately 12 hours of instruction per week. In continuing education the estimated usage ranges between 40 and 75 hours per month.

It was estimated that another three hours per week, the system would be used by the College of Engineering for other communications applications.

The total beginning use by the College of Engineering ranged from a minimum of 22 hours per week, to a maximum potential of 70 hours per week, mostly during the regular school terms.

Departments of Chemistry, Computer
Science, Geology, Mathematics, Physics,
and Zoology

1. Chemistry: Estimated 5 hours per week
2. Computer Science: Estimated 4 hours per week
3. Geology: None
4. Mathematics: No estimate given
5. Physics: No estimate given
6. Zoology: No estimate given

College of Pharmacy

1. For uses with the clinical clerkship program, it is estimated the communications system would be used from 3 to 5 hours per week, between 7:00 a.m. to 9:00 a.m., or between 4:00 p.m. to 7:00 p.m.
2. Computer data use is estimated at 1 to 3 hours per day between 7:00 a.m. and 11:00 p.m.
3. Voice lines for drug information center: Time use estimate not possible at this time.
4. Sharing with University of Washington: 6 hours per month.
5. Pharmacy recruitment program: 6 hours per month.

It is estimated that use of television communication would require 32 hours per month and 50 hours per month computer use.

Social Science Departments

1. Sociology: No estimate given.
2. Native American Studies Program: No estimate given.
3. Anthropology: Uses listed, but no estimate of time given.
4. Political Science: No estimate given.
5. History: Commitment made on use, but no specific time use available.
6. Psychology: No estimate given.
7. Police Science: 5 hours per week during school year.

Humanities

1. Communications: Instruction--no time use designated; Seminar, Symposia-- 1 hour per month.
2. English: No time use designated.
3. Fine Arts: No time use designated.
4. Foreign Languages:
 - a. Instruction--Undergraduate: 3 hours per week.
 - b. Continuing Education: 3 hours per week.
 - c. Research Activity: 5 to 10 hours per month.
 - d. Seminars--Symposia: 3 to 5 hours per semester.
 - e. Facsimile and Data: "Good use would be made."

5. Music: 1 or 2 extension undergraduate courses--3 hours per week. Conferences and Consultations: 2 to 5 hours per month.
6. Philosophy: Depends upon demand.
7. Speech: Instruction-- 6 to 12 hours per week. Conferences and Consultations--2 to 5 hours per month.

Use of the system for instruction: 15 to 21 hours per week for area total. Research Usage: 5 to 10 hours per month for area total. General Communications: 10 hours per month for area total. Facsimile and Data use: Some use is expected.

College of Agriculture

Estimates of use were summarized at 11 hours per week.

College of Education

There was no specific number of hours listed, but it is anticipated there would be significant use of the system.

College of Veterinary Medicine

It was estimated that use by this College would be about 4 hours per week for regular class time, and irregular weekend continuing education for practitioners. Types of use were identified as:

1. Graduate courses
2. Undergraduate courses
3. Continuing Education
4. Research
5. Facsimile and data use to research center

College of Economics and Business Administration

No specific hours listed, but uses identified were:

1. Seminars

2. Workshops
3. Use of off-campus resource persons to speak to campus classes
4. Offering graduate and perhaps undergraduate courses
5. Work possibly with community colleges

College of Home Economics

The four departments of this College reported their estimate of usage as follows:

1. Child and Family Studies Department

- a. Undergraduate courses: 6 hours per week
- b. Graduate courses: 3 hours per week
- c. Research activity: 10 hours per month

System could also be used for conferences during October and November, and March and April. Other potential uses: consultation, inter-library seminars, symposia, etc.

2. Clothing, Interior Design, and Textiles Department

- a. Undergraduate courses: 1 hour per month
- b. Continuing Education: 1 hour per month

Potential uses for research and conferences. Considerable potential for inter-library loan.

3. Food, Nutrition, and Institutional Management Department

Some potential use in undergraduate and graduate courses, continuing education and research.

4. Home Economics Education

Graduate courses and continuing education: 2 hours per month; and Student-teacher supervision conferences: 44 hours per year.

MINIMUM PROJECTED USE OF MULTI-PURPOSE
COMMUNICATION SYSTEM

College	Two-Way TV (hrs/week)	Computer and Other Uses (hrs/month)
Agriculture	11	. . .
Engineering	22 - 70	*
Home Economics	13	. . .
Veterinary Medicine	4	. . .
Economics and Business	*	. . .
Education	*	. . .
Pharmacy	32	50
Science and Arts		
Physical Sciences	9	*
Social Sciences	5	. . .
Humanities	19 - 26	. . .
Total	115 - 211 hrs/week	50 hrs/month

*Significant use indicated but no estimate of time given

Estimated Anticipated Additional Costs for Teaching and Production when using the Proposed Communications System for Instructional Applications

College of Engineering

No specific amounts were indicated as additional costs for teaching and production except the \$20,000 figure listed by Bill Knight. He also indicated additional staff requirements would include one faculty person and one technician. It was also pointed out that Stanford University has experienced the average operating cost for a given system (one-way video, two-way audio) to be that of \$2,100.00. This breaks down to \$60.00 per hour. It was also pointed out that if student fees were to pay the entire cost for the course at a fee of \$45.00 per quarter per unit, it would require 47 students per unit course per quarter. (The above figures include costs involved in use of the system as well as software costs.)

Chemistry, Computer Science, Geology, Mathematics, Physics, and Zoology

1. Chemistry: Anticipated no extra costs for teaching and production in their use of the system the first year.
2. Computer Science: Anticipates extra costs in their involvement to be between \$7,500.00 and \$10,000.00 the first year.
3. Geology, Mathematics, Physics, and Zoology made no predictions.

College of Pharmacy

The College of Pharmacy listed no specific anticipated additional costs, but indicated they have already requested funding in a grant from the National Institute of Health to cover such costs, in anticipation that the network will become a reality in the near future.

Social Science Departments

1. Sociology: No indication given.

2. Native American Studies; No indication given.
3. Anthropology: "It is impossible at this stage of thinking to discuss costs and outlays. It is difficult to see how such uses and their costs will work out in advance. Some kind of enabling grant which would allow experimentation by departments, or early use on a flexible demand basis, seems necessary at this stage. It is a case of potential need and not a pressing immediate need in the Anthropology Department."
4. History: "We anticipate that our additional costs for maps and other teaching aids would be \$2,000.00 per year. We do not have any valid basis for estimating the cost of preparation of TV video tapes."
5. Psychology: No specific amount listed.
6. Police Science: "No additional costs are anticipated at the present time for teaching Police Science 101 and 102. However, if this system becomes totally operational and further expansion is desired, it is suggested that a grant request be prepared and submitted to the Law and Justice Office of the Planning Community Affairs Agency of the Office of the Governor, for funds to finance the expanded program. There are Federal funds available through the Law Enforcement Assistance Administration, U.S. Department of Justice."

Humanities

1. Communications: "If more than minimal use, it will require staff." A figure of \$400.00 to \$500.00 was also given.
2. Foreign Languages: The anticipated need listed was for additional time-slip help, but probably no additional staff required.
3. Music: "Possible one associate professor."
4. Philosophy: "Function of the demand."
5. Speech: "Probably two FTE's in early professional ranks, plus \$1,375.00 in addition to salaries (00 Time-slip, \$125.00; 01 Consultants' fees, \$750.00; 03 Audio-Visual, \$250.00).

College of Agriculture

No estimate given.

College of Education

Additional staff and costs must be expected. Many felt that, depending upon the extent of use and new services provided, there would need to be faculty time allotted to this program. There would also be need for technical help because the system will not succeed unless transmission is of the highest quality and reliability. Past experience with media would lead to the projection that it will not 'save' money, because new uses are found which eventually require the allocation of resources.

College of Veterinary Medicine

Additional staff, but no estimate possible.

College of Economics and Business Administration

No Estimate given.

College of Home Economics

1. Child and Family Studies: Estimates need two additional faculty members, one at graduate and one at undergraduate level.
2. Clothing, Interior Design, and Textiles: One additional faculty person and graphic assistance.
3. Food, Nutrition, and Institutional Management: Technical assistance, graphics, and assistant for grading papers.
4. Home Economics Education: Could use present staff more effectively with this system.

Estimated Potential Sources of Income to Help Cover Costs for use of the Proposed Communications System

College of Engineering

No detailed proposal for funding has been presented, however, it has been suggested that we follow the lead of Stanford and others who have obtained support from the local industries who use their educational services. For extension courses, at least part of the funding should come from tuition. Reduction in teaching loads due to cooperative offerings can partially offset cost. Also, the fact that we will have students for whom we need not supply classroom or laboratory space, will help offset cost.

Chemistry, Computer Science, Geology, Mathematics, Physics, and Zoology

1. Chemistry: No comment
2. Computer Science: "Student fees, other institutions would pay costs of data transmission. Possibly an NSF regional computer center grant."
3. Geology: No comment
4. Physics: No comment

5. Mathematics: "We would not expect to recover the cost. How the University does it is up to the central administration."
5. Zoology: No comment

College of Pharmacy

1. Clinical Clerkship Program: "The funding for a part of the cost for this connection may be available from a National Institute of Health grant for which the College of Pharmacy has applied."
2. Drug Information Program: "The cost of this use could possibly be supplied by a grant requested to the NIH or by charging the users a fee for the connect time."

"For communication purposes with the University of Washington (sharing visiting lecturers, graduate student conferences, seminars, or classes, etc.) funding could have to be budgeted and this would thus increase budgets. However, the benefits are a decrease in travel and an increase in communication and cooperation between the two schools."

Social Science Departments

1. Sociology: No comment
2. Anthropology: "It is difficult to see how such uses and their cost will work out in advance. Some kind of enabling grant which would allow experimentation by departments or early use on a flexible demand basis seems necessary at this stage."
3. Political Science: No comment
4. History: "The Department would like to know what study has been made by the University of any such systems as the one proposed for us. Have the concrete contributions justified the expense?"
5. Psychology: No comment
6. Police Science: ". . . if this system becomes totally operational and further expansion is desired, it is suggested that a grant request be prepared."

Humanities

1. Communications: "Extensive use of this system by this department would be contingent upon additional resources being made available."

2. Fine Arts: No comment
3. Foreign Languages: ". . . off-campus students participating in such courses would, we assume, pay WSU the regular fees. The cost of transmitting the class, therefore, would seem to belong to the University and not to the Department."
4. Music: No comment
5. Philosophy: No comment
6. Speech: "If departmental participation in cost is to be required, the departmental budget will need to be revised to provide funding. We cannot withdraw support from other projects in order to support this one, especially with as high a cost factor as you list." (\$50.00 per hour)

College of Agriculture

Prusser Experimental Station is not certain how much they can save in time and travel with the proposed system, but Dr. J. S. Robins reported he would try to support the new venture up to \$2,000.00 per year in purchased time. That comment was before Dr. Robins left for a position in Washington D.C., and before the Governor's request on cutting back on the budget.

College of Education

No comments were made specifically on potential income other than "The assumption behind the responses was that the question of finance and the priority, in relationship to other needs was not a factor."

College of Veterinary Medicine

No estimate possible

College of Economics and Business Administration

No comment

College of Home Economics

1. Child and Family Studies: Grants and tuition.
2. Clothing, Interior Design, and Textiles: tuition and research funds.

3. Foods, Nutrition, and Institutional Management; No comment
4. Home Economics Education: Support of the network instead of present travel and related expenses.

CONTINUING EDUCATION/EXTENSION SUB-COMMITTEE

Norman A. Braden, Chairman

MEMORANDUM

TO: Norman A. Braden, Chairman
Sub-Committee on Continuing Education/Extension
for a Multi-Purpose Communications System

FROM: James W. Hardie

DATE: April 23, 1970

SUBJECT: Mandate for Sub-Committee Study

I am pleased you could accept the chairmanship of this important study area. We would like your committee to conduct a thorough survey of the uses that various extension services could reasonably expect to make of such a network indicating the probable hours of use; the frequency of use; the types of credit probably required; some evidence of faculty commitment; expected use of computer services; probable costs of teaching and production; required locations of teaching stations and other related facts; and sources of income and amounts to be reasonably expected from each source such as from individual registrations, grants, and state appropriated funds.

I hope it will be possible for you to include someone on your committee from both Technical Extension Service and Cooperative Extension Service so their use of such facilities can be incorporated into your report.

I would very much appreciate your report by June 1, if possible, to give our Committee time to finalize our report to Dr. Beasley by July 1. If the University is to make a substantial commitment to the establishment of the proposed microwave network, it can only do so on the basis of a thorough understanding of its uses, needs, and funding.

J. Reginald Miller, Arnold Gallegos, and I make up the coordinating committee for conducting this depth study analysis. We want you to know that we stand ready to assist and work with you in any aspect of your Sub-Committee work. You are free to select other committee members of your choice.

Continuing Education/Extension Subcommittee;
Norman A. Braden, Chairman

The data gathering and the conclusions with respect to continuing education and extension potentials of the "multi-purpose communications system" under consideration were probably confused as a result of the arbitrarily narrow definition assigned to the terms "continuing education" and "extension." These terms were given the restricted meaning of "non-credit adult education;" no activities involving credit were to be included, though university extension or continuing education usually encompasses large credit programs.

There is reason to believe that not all respondents made the distinction that only non-credit activities were to be regarded as "continuing education." Just what information was elicited about extension type credit activities is not known, nor is it known what may have been done with this information in connection with this report. Certainly such information should have been gathered, and just as certainly it should have been processed by persons familiar with university extension programming. Almost certainly, for instance, no section of the complete report will examine the potential of the system for correspondence study, and an assessment of extension (credit) class potential, if it has been made, was made without the benefit of information from General Extension Service, which has been responsible for this activity for about 50 years at Washington State University.

Aside from these shortcomings, the estimates of different departments and colleges vary greatly as regarding the use of the system for continuing education activities. As would properly be expected, very little quantitative information was reported; respondents were naturally uncertain as to the extent a new system--a new teaching technology--could be used. Without prior experience in conducting continuing education programs using the several media encompassed by the proposed system, one could not be expected to supply quantified estimates of any validity.

Anticipated Users and Extent of Use

1. Agriculture: Anticipated extensive use, with probable increasing emphasis on continuing education. Potential for continuing education thought to be great, but no specifics available.
2. Education: Unspecified continuing education efforts to "try out" some informal in-service training of teachers. A new type of service envisioned by some education faculty. A few over 1/2 of faculty in the department returned their questionnaires, and of these about 60% were favorable to the system as a whole, though not specifically referring to continuing education. (Teacher, the clients, are primarily interested in credit courses.)
3. Engineering: 10 to 15 hours per week during the school year. (Knight estimates 15 to 20 hours.) Interest levels: Architecture--Strong; Civil Engineering--Strong; Electrical Engineering--Fairly strong; Agricultural Engineering--Equivocal; Chemical Engineering--Cautious; and Mechanical Engineering--Fair.
4. Health Sciences: (Nursing and Pharmacy) Nothing specific as to how much use. Diffuse enthusiasm for continuing education and courses for nurses, pharmacists, medical technicians, dietitians, and medical students. "Courses should be offered Monday through Friday in all available communities (Spokane, Walla Walla, Pullman, Pasco, Richland, Yakima, and Wenatchee) throughout the year, including the summer months." (Paraphrase in part.)
5. Humanities Area: "It would appear that projected first year use of a multi-purpose microwave communications network by units in Humanities would be minimal."
6. Natural Sciences Area: No continuing education users appear to be likely. No suggestions as to costs or income.
7. Social Sciences Area: Some interest in such a system, and a recognition that uses probably would be found for it if it existed. Social Work indicated enthusiasm for continuing education uses of the system, and would anticipate in-service presentations for professional, para-professional, and administrative personnel.
8. Veterinary Medicine: Future use envisioned, but nothing specific.

Estimated Costs and Income

1. Agriculture: "Estimates of extra costs per department for using the microwave system for teaching and production the first year ran from \$2,500 to \$5,000." (This for all uses--not just continuing education.) Cooperative Extension's services are usually free, so no income would be anticipated.
2. Education: "Additional staff and costs must be expected. Past experiences with media would lead to the projection that it will not 'save money'." No estimate of income.

3. Engineering: No estimate of costs of income (though fee income might be substantial [NB]).
4. Health Sciences: No estimates of costs or income (though fees should bring in substantial amounts of money to offset costs [NB]).
5. Humanities Area: No estimate of costs or income.
6. Natural Sciences Area: No estimate of costs or income.
7. Social Sciences Area: No estimate of costs or income.
8. Veterinary Medicine: No estimate of costs or income.

Geographical Priorities

1. Agriculture: Community Colleges (state-wide) and Prosser, Puyallup, and Wenatchee particularly.
2. Education: Eventually state-wide special interest now in Tri-Cities and Spokane.
3. Engineering: Spokane, Walla Walla, Richland, Seattle, Ephrata, Olympia.
4. Health Sciences: Pullman, Spokane, Walla Walla, and Tri-Cities; later, eastern Washington.
5. Humanities Area: Favor state-wide system, especially for four-year institutions.
6. Natural Sciences Area: None
7. Social Sciences Area: Eastern Washington; then state-wide. Social Work would be especially interested in Spokane at first.
8. Veterinary Medicine: "State-wide system increases interest."

Personal Commentary

It is obviously impossible for persons not familiar with the operation of extension programs to provide meaningful estimates of the kinds and amounts of use they would be able to make of a system such as we are studying. In most instances, if they are representative of academic departments, they will not have received much communication from "the field". Such communication is usually better in the case of the professional school, but even here there may be little sense of the potential demand for instruction of a continuing education

character. In addition, persons not familiar with the operation of continuing education programs are not usually able to provide very accurate estimates of program costs, or the potential income that might be generated. Often they are not familiar with the various formats and combinations of formats that might be available in presenting programs for adults, or the feasibility of employing them in a given setting.

Finally, it is very difficult to judge with any accuracy the needs or opportunities for continuing education programs in a given discipline or geographic area. Errors of wild optimism are rarer than pessimistic ones, principally because program expansions require, in addition to more money, an increased load of work. Pessimistic predictions reflect a reluctance to change; a vote for the status quo. Sometimes this is wise; sometimes it is very unfortunate.

With respect to the potential of a system like the one proposed, I believe optimism is justified. The potential is there for increased programming, both in non-credit areas and for credit offerings. Whether the potential of the system is achieved will depend on the determination of the university to commit the necessary resources to the area of continuing education. These resources are primarily faculty and money. No communication system will help unless there is an increased commitment on the part of the university itself to the whole field of continuing education. This commitment must be made obvious to the faculty by the promulgation of policies that encourage faculty members to participate actively.

I believe that a multi-purpose communications system will be found to be much like a development in the computer area--more things are possible, once we learn how to use the equipment effectively, but it will not save money. It will cost more. Whether the benefits justify the increased costs is the central, if not the only issue. At the present time, no matter how long we study the question, our final decision will depend on whether we want to try to make it

work. If Washington State University really wants to make such a system economically and educationally effective, I believe it can do so.

UTILIZATION OF PROPOSED CCTV SYSTEM--CONTINUING EDUCATION

Department or Unit	Program Outlet(s)	Subject or Topic	System Time	Attendance
Cooperative Extension	Spokane/Walla Walla/Pasco	Textiles	15 hours	25/25/25
Cooperative Extension	Spokane/Pasco	Foods and Nutrition	6 hours	20/20
Cooperative Extension	Spokane/Walla Walla/Pasco/ (Prosser)	Adult Education	10 hours	10/10/10/(10)
Cooperative Extension	Spokane/Walla Walla/ (Prosser)	Community Resource Development	5 hours	20/20/(20)
Cooperative Extension	Pasco	Home Economics Days for Women	6 hours	300
Cooperative Extension	Walla Walla	Needs	2 1/2 hrs. ?	
Cooperative Extension	(Prosser)	Agronomy	2 hours	20
Engineering Extension		Fluid Mechanics	15 hours	25-100
Engineering Extension		Power Systems	30 hours	25-50
Engineering Extension		Electronics Updating	30 hours	25-100
Engineering Extension		Cable Engineering	20 hours	25-50
Engineering Extension		Introduction to Chemical Engineering	45 hours	15-25
Engineering Extension		Economic Analysis in Engineering	15 hours	?
Engineering Extension		Computers in Construction	?	?

UTILIZATION REPORT -- Continued

Department or Unit	Program Outlet(s)	Subject or Topic	System Time	Attendance
Engineering Extension		Polymer Science	30 hours	15-25
Engineering Extension		Criminalistics	30 hours	25-50
Engineering Extension		Materials and Environment	30 hours	25-50
Pharmacy	Spokane/Walla Walla/Pasco/ Pullman	Pharmacology	10 hours	25-200
Pharmacy	Spokane/Walla Walla/Pasco/ Pullman	Management	10 hours	25-200
Pharmacy	Spokane/Walla Walla/Pasco/ Pullman	Pathology	10 hours	25-200
Social Work	All Terminals	Updating Professional Practice (Professional)	20 hours	125
Social Work	All Terminals	Issues in Social Work (Pro- fessional)	10 hours	125
Social Work	All Terminals	Occasional Presentations (Pro- fessional)	3 hours	125
Social Work	All Terminals	Management of Welfare Programs (Administrative)	20 hours	75-100
Social Work	All Terminals	Occasional Presentations (Admin- istrative)	3 hours	75-100
Social Work	All Terminals	("If") Graduate Students' Practicum Course	45 hours	50-60

UTILIZATION REPORT--Continued

Department or Unit	Program Outlet(s)	Subject or Topic	System Time	Attendance
Social Work	All Terminals	("If" Undergraduate Supporting Courses	45 hours	30
Social Work	All Terminals	Social Work for Para-professionals	20 hours	300
Social Work	All Terminals	Social Work for Para-professionals (no degree)	20 hours	?
Social Work	All Terminals	Social Work for Child Care, Foster Parents, etc.	?	?

Business Administration

Nursing

Education

HEALTH SCIENCES SUBCOMMITTEE:

Mrs. Milda B. Roberts, Co-chairman
Keith Campbell, Co-chairman

MEMORANDUM

TO: Hilda Roberts, Chairman
Medical Sub-Committee
for a Multi-Purpose Communications System

FROM: James W. Hardie

DATE: April 23, 1970

SUBJECT: Mandate for Sub-Committee Study

I am very pleased that you are willing to accept the chairmanship of this important study area. Your committee is asked to explore by means of a survey and/or other means, potential users of this proposed communication system from the health science areas. Use of the system should not only include instructional applications, but the whole broad range of communication this system provides.

You are free to select your own committee members, but we are willing to assist you in contacting potential members and suggesting possible persons to serve you if you would like. Representation on the committee might be considered from the College of Pharmacy, College of Veterinary Medicine, a person representing the hospitals in the geographical areas served, or from the Regional Medical Program, or any other representation that seems logical to you to accomplish the objective.

The objectives for your Sub-Committee are as follows:

1. Identify as specifically as possible the full range of users desiring to make use of this system as it exists in the initial phase with a potential starting date of September 1971.
2. Identify the specific uses of the system by users including instructional, general communication, computer/data, dissemination of audio-visual resources, facsimile, etc.
3. Identification of the amount of time use required for each application (in hours), frequency (day, week, month), to what locations on the system, and approximate time of day or night that use is required.
4. Determine if there are uses that could be made of the system by medical people during slack periods, such as during the Summer months.

Hilda Roberts
Page 2
April 23, 1970

5. Identification of potential sources of income for each use broken down into registration fees, grants, state funds, or other sources.
6. Determine facility requirements to carry out the identified uses, at each location, and explore sub-system requirements.

I would very much appreciate your report by June 1, if possible, to give our Committee time to finalize our report to Dr. Beasley by July 1. If the University is to make a substantial commitment to the establishment of the proposed microwave network, it can only do so on the basis of a thorough understanding of its uses, needs, and funding.

J. Reginald Miller, Arnold Gallegos, and I make up the coordinating committee for conducting this depth study analysis. We want you to know that we stand ready to assist and work with you in any aspect of your Sub-Committee work. You are free to select other committee members of your choice.

Health Sciences Subcommittee: Mrs. Hilda B. Roberts and
Keith Campbell Co-Chairmen

Committee Members

Mr. Robert Baden
Assistant Administrator
Deaconess Hospital

Mr. Larry Belmont, Coordinator
Washington/Alaska Medical
Program--Eastern Washington

Miss Marjorie Borchers
In-service Coordinator
Deaconess Hospital

Mr. Keith Campbell, Co-Chairman
Assistant Professor--College of
Pharmacy, Washington State
University

Mrs. Donna Cornish
In-service Coordinator
Holy Family Hospital

Mrs. Virginia Glover
In-service Coordinator
St. Luke's Memorial Hospital

Mr. Jim Hardie, Chairman
Instructional TV Coordinator
Washington State University

Miss Betty Harrington
Director, School of Nursing and
Educational Coordinator
Sacred Heart Hospital

Mr. Michael Heinrich
Assistant Administrator
Sacred Heart Hospital

Dr. Robert Heskett, Physician
and Coordinator, Medical Education,
University of Washington

Mr. Robert Janvier
Assistant Administrator
St. Luke's Memorial Hospital

Mr. C. Lovelase
Assistant Administrator
Management Service
Holy Family Hospital

Mr. Miles Patrick, Manager
Pattelle Northwest
Systems Programs for Hospitals

Mrs. Hilda Roberts, Co-Chairman
Director, Center for Nursing
Education

Mrs. Walter Schaar, General
Manager--KSPS-TV, Channel 7

Mr. Ron Valley, Chief Engineer
KSPS-TV, Channel 7

Mr. Gerald White, Associate Admin-
istrator, South Crest Convalescent
Center

CENTER FOR NURSING EDUCATION
South 10 Cedar Street
Spokane, Washington

MEMORANDUM

TO: Mr. James W. Hardie, Chairman, Study Committee for the Multi-purpose Communications System for Washington State University

FROM: Hilda B. Roberts, Co-Chairman, Health Sciences Sub-Committee for The Multipurpose Communications Network and Director of the Center for Nursing Education, Spokane

Date: March 17, 1971

Subject: FINAL REPORT OF HEALTH SCIENCES SUB-COMMITTEE

During the past year, the Health Sciences (Medical) Sub-Committee has been involved in studying the potential uses, needs and advantages of a multipurpose communications network for eastern Washington and/or the state of Washington. This study was conducted at Washington State University and in Spokane at the Center for Nursing Education.

Mr. Keith Campbell, Assistant Professor, College of Pharmacy, served as co-chairman with me on this committee. Mr. Campbell contacted and worked with the health professions areas on campus. This included the Colleges of Veterinary Medicine and Pharmacy, the Pre-medical and Pre-dental programs, and Memorial Hospital. You have received a report from Keith Campbell relating to the need for a multipurpose communications system from the health science disciplines on campus. (Memorandum dated December 7, 1970, from Mr. Campbell to Mr. R. F. Tinder.) I will therefore limit my report to the activities and recommendations made at the Center for Nursing Education by the Spokane Health Professions Sub-Committee on the Multipurpose Communications Network System.

We have found an extremely enthusiastic response to the need for a multipurpose communications system for Washington State University which will broaden the horizons of learning both on and off campus.

The final report for the Health Sciences Sub-Committee is enclosed.

HBR:km

Subcommittee Activities

The Health Sciences Subcommittee held two meetings, on May 21, 1970 and September 24, 1970. We determined the uses and advantages of a multi-purpose communications network system. This Committee also recommended that a subsystem in Spokane be explored which would interconnect hospitals, the colleges, and university.

A Subsystem Committee consisting of members from the Subcommittee was appointed to investigate a feasible subsystem in Spokane that would be compatible to the proposed multi-purpose communications system proposed at Washington State University. The Subsystem Committee met on October 6, 1970 at the KSFS studio. Copies of the minutes of these meetings are attached to this report.

Mr. Keith Campbell, Co-Chairman and Mrs. Hilda B. Roberts, Co-Chairman of the Health Sciences Subcommittee, met at frequent intervals with Mr. James Hardie and the other Subcommittee Chairmen to coordinate the over-all study of the proposed communication system at Washington State University.

Mrs. Hilda Roberts had the opportunity to attend the Eighth Annual Convention of the Association for Data Systems in Miami Beach, Florida, May 13-15, 1970. The program, "Education Through Technology," included excellent sessions on the application of data processing ideas and techniques in education. Many topics were devoted to relevant systems presently operating in educational institutions such as computer managed instruction, time sharing, test design, and test selection.

After participating in this above mentioned convention the Co-Chairman recognized more than ever the critical need for Washington State University to move ahead immediately to implement in our educational system many of these modern technological devices which are now available.

Report

1. Identify the full range of users desiring to make use of this system.

The faculty of the Center for Nursing Education and the Health Sciences Subcommittee reviewed the use of a multi-purpose communication system in Eastern Washington and/or the State of Washington. We believe that an MPC system would be the most effective means of bringing University offerings to its students who are residing off-campus, such as nursing, sociology, education, and medical technology students. It would also provide the opportunity for professional health workers to keep up-to-date on scientific and educational developments in their home environment. The users of an MPC system include:

Undergraduate Students

1. Provide CCTV Instruction for Nursing Center Students and Faculty by:

- a. Offering non-nursing and/or required upper division credit courses to students at Nursing Center, for example, Abnormal Psychology, Medical Sociology, and Child Psychology. At least one non-nursing course should be offered to the nursing students each semester as indicated in their curriculum.

Since General Extension Service no longer offers a regular evening program in Spokane, the WSU students have limited opportunity to take non-nursing courses while in Spokane. If they take these courses at a Spokane college, the student has additional tuition expense. CCTV would be an effective method of bringing WSU instruction to the Spokane Center. These television courses should eventually become part of their university program, since these students pay regular WSU tuition and fees while in Spokane.

- b. Offering selected seminars of lectures for students at Nursing Center. These could be given by University Professors in Pharmacy, Nutrition, Anatomy, Physiology, and other related health areas.
- c. Offering in-service education programs to nursing faculty, i.e., University professors could give seminars in such topics as evaluation, new education, and science developments.

2. Future Planning:

- a. If, in the future, CCTV would be available between the Nursing Center, and Spokane hospitals, unlimited possibilities would open up in the clinical teaching courses.
- b. By 1974, or when the new Heald Annex is completed, it is expected that the campus nursing classrooms will be located in the Heald Building, and that CCTV will be available there. Many programs for Eastern Washington nurses could originate from this campus facility.

Continuing Education Students

There would be excellent opportunities to develop Continuing Education programs in Nursing through CCTV, which would benefit registered nurses and practical nurses in all parts of Eastern Washington. Specific areas which could be developed by:

1. Offering general education credit courses taught by University Professors for R.N.'s in Spokane, Walla Walla, and Tri-City areas. These courses could apply towards their degree in nursing. We already have a list of over 80 R.N.'s who plan to work towards their bachelor's degree.
2. Offering upper division nursing theory courses to registered nurses in Eastern Washington which could be taught by Nursing Center faculty in Spokane, or offering course material which would be helpful to R.N.'s preparing for their challenging examinations in nursing.
3. Offering continuing education nursing programs and seminars by Nursing Center faculty in Spokane, which could be televised to R.N.'s in Pullman, Walla Walla, and Tri-Cities.
4. Offering of joint lectures, conferences or seminars by University of Washington School of Nursing faculty and Center for Nursing Education faculty to R.N.'s in Eastern Washington.

Professional Activities

The district nurse's associations (e.g. Whitman County, Spokane County, Walla Walla County, Franklin Country) could participate in utilizing television and voice lines to provide continuing education for nurse practitioners. Two committees of the Council on Practice, Washington State Nurses Association (WSNA) have recently made a number of recommendations concerning the urgent need for more nurses throughout the state to participate in continuing education endeavors. Traditional workshops, conferences, and institutes have not reached sufficient numbers of practicing nurses who need to up-date and maintain their nursing knowledge and competencies. WSNA has been particularly concerned about the needs of nurses practicing in rural areas and small towns. It is frequently impossible for them to leave job and home responsibilities to attend courses

and educational meetings, and yet they are greatly in need of the latest knowledge since they must often function independently outside the hospital, or with a minimum of supervision within the various agencies.

Both of the above mentioned committees of WSNA have recommended that the state and district associations explore the feasibility of utilizing mass media in conjunction with institutions of higher learning throughout the state. Television was particularly mentioned as one means, especially the use of videotapes.

WSNA is also concerned about the needs within the state for nurses with advanced preparation who can assume leadership positions in clinical practice, nursing service administration and nursing education. There continues to be a shortage and uneven distribution. Television courses would be one means of assisting qualified nurses to obtain additional preparation right in their own community.

2. Identify the specific uses of the system by users including instructional, general communication, computer/data, dissemination of audiovisual resources. The uses of the MPC system by the health professionals would include:
 - a. Closed-circuit television for undergraduate students and continuing education programs and courses for registered nurses and other health personnel including pharmacy, medical technology, dietetics, and medical students. In the near future, Washington State University will be enrolling first year medical students through the University of Washington Medical School WAMI program (Washington/Alaska/Montana/Idaho regional medical school program). Conferences and lectures originating at the University of Washington School of Medicine could be held for medical students and faculty located at Washington State University or in Spokane.
 - b. Computer data banks and information retrieval systems and computer assisted instruction. This would provide information storage and warehousing of materials with accessibility to the information at electronic speeds. Eventually library materials from the Library of Congress and regional medical libraries will be reduced to microfilm to make it possible to students at distant centers or universities to retrieve a given page or document on a projection screen at the terminal, or a student may be able to make hard copies with a telecopier.

Since the technology already exists for such a system, it seems pertinent that the Computer based at WSU become an important information center which would be linked by communication lines to many other area colleges, universities, and hospitals in the region and with the Center for Nursing Education in Spokane.

- c. Voice lines to interconnect the Center for Nursing Education, Washington State University and University of Washington with hospitals and health agencies in Washington.
3. Identification of the amount of time use required for each application.
- a. The non-nursing credit courses (Abnormal Psychology, Child Psychology, Medical Sociology) could be taught by Washington State University professors in Pullman through CCTV to the students at the Center for Nursing Education in Spokane. Daytime hours from 8:00 a.m. to 4:00 p.m. Monday through Friday would be desirable. In some instances, these classes could be taught after 4:00 p.m.

By fall 1971, we will have about 150 junior and senior students at the Center for Nursing Education. The class schedule will have more than one section in many courses. The time of day to offer the television classes would be quite flexible. We would expect to teach at least one 3 credit course by CCTV per semester.

- b. The continuing education courses for registered nurses should be offered between 4:00 p.m. and 6:00 p.m. or 7:00 to 11:00 p.m. Monday through Friday for the nurses who work days and nights. Classes for nurses on night or evening shift could be given between 8:00 a.m. and 1:00 p.m.

The continuing education courses should be offered in all available communities in Eastern Washington (e.g. Spokane, Walla Walla, Pullman, Pasco, Richland, Yakima, and Wenatchee) throughout the year including summer months.

COMMUNITY COLLEGES SUB-COMMITTEE

William H. Crawford, Chairman

MEMORANDUM

TO: William H. Crawford, Chairman
Sub-Committee on Community Colleges
for a Multi-Purpose Communications System

FROM: James W. Hardie

DATE: April 23, 1970

SUBJECT: Mandate for Sub-Committee Study

I am very pleased that you are willing to accept the chairmanship of this important study area. A great deal of interest has been expressed by several community colleges in the development of such a communications network. The Walla Walla Community College, and the Columbia Basin Community College are aware of the proposal and have expressed strong interest to be involved as they are within the proposed service area of the system. Discussion has not been held with personnel from the Spokane Community Colleges, but it is quite likely that they too would be highly interested in participating in this beginning program.

While the proposed system would probably be developed with WSU as the agency contracting for these communication services, it would be entirely possible for the community colleges to not only work out arrangements for cooperative work with WSU, but also with each other. In other words, they might wish to plan use of the system just between themselves. Such use would have to be coordinated and scheduled through WSU, however.

We would like your sub-committee to define the interest of each community college in the network; conduct a survey of probable uses, including frequency of use and the number of hours, probable times of day, and facility requirements at each location. Identification of courses which might be taught cooperatively between community colleges or in cooperation with WSU is needed. Study should be given to types of credit required; probable use of computer services; some evidence of faculty commitment; expected costs of teaching and support services required at home institutions. Sources of income should be determined with some indication of the percentage expected from each source, such as from registration, grants, and state funds.

Our committee would very much appreciate receiving your report by June 1, if possible, in order to give our Committee time to finalize its report to Dr. Beasley by July 1. If the University is to make a substantial commitment to the establishment of the proposed microwave network, it can only do so on the basis of a thorough understanding of its uses, needs, and funding.

J. Reginald Miller, Arnold Gallegos, and I make up the coordinating committee for conducting this depth study analysis. We want you to know that we stand ready to assist and work with you in any aspect of your sub-committee work. You are free to select other committee members of your choice. We would suggest that you include representatives from the community colleges.

MEMORANDUM

TO: Jim Hardie, Chairman Coordinating Committee,
Study of a Multi-purpose Communications Network

FROM: W. H. Crawford, Chairman, Sub Committee on Community Colleges.

DATE: December 14, 1970

SUBJ: Report - Sub Committee - Community Colleges.

1. Columbia Basin, Walla Walla and Spokane Community Colleges were contacted in person and by letter relative to participation in the communications network; numerous telephone conversations also were used.

2. The problems arising were of a nature that prevented getting specific information for planning. The community college presidents were interested in such a system but were so concerned about finances that they seemed reluctant to enter into any planning or to give specific information on how such a system could be used.

In general the presidents' reactions could be summarized as follows:

1. Until actual costs are known we will not be able to furnish specific planning information.

2. They knew of no way to finance locally in order to cooperate.

3. Impossible at present time to figure cost per course.

4. W.S.U. seemed unable to give any idea as to how many hours the wire would be in use for their own programs.

5. Could not give required facilities on local campuses. Spokane indicated they would like to have courses from 7:30 a.m. to 3:30 p.m.

6. Best cooperation could be achieved with courses at the Sophomore level.

7. Until the community colleges can find a source of money it seems unlikely that they can participate in constructive planning.

8. Walla Walla College would like to include a multi-purpose communications system in their new campus, but they indicate that they have no financing.

LIBRARY SUBCOMMITTEE

Gerald R. Brong, Chairman

MEMORANDUM

TO: Gerald R. Brong
Sub-Committee on Library Use
of a Multi-Purpose Communications System

FROM: James W. Hardie

DATE: April 29, 1970

SUBJECT: Mandate for Sub-Committee Study

I am pleased you could accept the chairmanship of this important study area. We would like your committee to study the ways that library resources at WSU or other institutions or agencies involved in the initial system operation might be made more easily available to support instructional, research, or other activities involving the use of this system.

Your committee should explore the interest of the State Library in cooperating in a mini-network pilot project to gain information and experience useful to the development of their State Library Network, but regardless of this potential development, there are those service areas in which library resources are needed to support the instructional and research activities that involve the use of this proposed system. Identification of those services which might be provided with a model of how they might be implemented in such a program is requested.

Estimated cost factors in providing such services need to be identified and any recommendations on ways of funding these services would be very helpful.

You are free to select other committee members of your choice. You may wish to have representation of a librarian from the community colleges and the Center for Graduate Study.

I would very much appreciate your report by June 1, if possible, to give our committee time to finalize our report to Dr. Beasley by July 1.

J. Reginald Miller, Arnold Gallegos, and I make up the coordinating committee for conducting this depth study analysis. We want you to know that we stand ready to assist and work with you in any aspect of your Sub-Committee work.

Library Subcommittee: Gerald R. Brong, Chairman

Introduction

Subcommittee Members

Betty Roberts, WSU Science Library
 Joselyn Druschel, WSU Technical Services Division
 Bill Gnaedinger, WSU Library Associate Director
 Chris Stevenson, Battelle-Northwest Technical Library
 Brydean Vickery, Librarian, Columbia Basin College
 Gerald Brong, Audio-Visual Center WSU, Chairman

Charge Given to Library Subcommittee

In a memo from Jim Hardie dated April 29, 1970, the areas to be explored by the Library Subcommittee were identified as:

Your committee should explore the interest of the State Library in cooperating in a mini-network pilot project to gain information and experience useful to the development of their State Library Network, but regardless of this potential development, there are those service areas in which library resources are needed to support the instructional and research activities that involve the use of this proposed system. Identification of those services which might be provided with a model of how they might be implemented in such a program is requested.

Estimated cost factors in providing such services need to be identified and any recommendations on ways of funding these services would be very helpful.

Mini-Network Proposal

On January 12, 1970, the Mini-Network Proposal was presented to the Title 3 Advisory Council (Washington State) for the Library Services and Construction Act. The presentation included a review of the initial planning underway on the WSU multi-purpose communications system, potential points within the state to be served by the system, and the proposal that a demonstration project, using WSU carrier capability, be undertaken. This mini-network proposal caused the establishment of the Mini-Network Steering Committee.

The demonstration capabilities considered essential in the Mini-Network project include:

1. Facsimile--use of the facsimile has not been the most successful undertaking. In the mini-network this would be a prime demonstration element. High speed, high quality equipment not usable on normal voice grade phone circuits to be employed. Allows for an analysis of costs and uses plus demonstration of capabilities.
2. Electronically transmitted--Cataloging data. Retrieval of machine stored bibliographic data for cataloging and limited reference. Use of MARC.
3. Data exchanges--high speed data exchanges between computer systems. Circulation control systems.
4. On-line reference--patron communicating directly with reference librarian or area center holding bibliographic files.
5. Staff and mini-network meetings--by electronic communication.
6. Shared staff development systems and training programs. Increased communication between libraries.

The Mini-Network Steering Committee established task forces to study the problems associated with the participation in such a demonstration project, as an aspect of Library Network Development in Washington, with a report with recommendations being issued on April 21, 1970, by the Steering Committee and directed to the Title 3 Council. The statement from the Steering Committee is included as an appendix to this report.

It is important to note that the Mini-Network Steering Committee is still in existence and will be called back into session when a report can be received concerning the proposed WSU system. This Steering Committee will be operated under the new Washington State Advisory Council on Libraries.

Washington State Advisory Council on Libraries

The WSACL supercedes the Title 3 and Title 4 Advisory Councils and has been established in a manner consistent with the Federal Library Services and Construction Act. The WSACL provides the "clearinghouse" body necessary for LSCA proposals from the state, it exists and operates by assignment from the Washington State Library Commission, has representatives from all groups of

library users and types of libraries, and is maintaining close contact with the development of the WSU multi-purpose communications system.

Liason with the University of Washington

Personnel in the UW Library and UW Closed-circuit Television Services have received copies of the Library Subcommittee's working papers and reports. Through the Mini-Network Steering Committee and the Title 3 Advisory Council personnel at the UW have been kept informed of the applications of the WSU system for libraries.

Coordination of WSU Planning and Feasibility Study with other Activities in the State

Coordination of effort has proven to be the most difficult task. Use of the word coordination is not to imply our coordinating the efforts of others-- we have tried to respond to activities of others by keeping information flowing and constantly revising our decisions.

Recommendations

The following recommendations are offered by the Library Subcommittee:

1. Library communication via electronic means is possible and desirable. If the system as proposed is developed, there will be library use of the system.
2. Use of the system by libraries at our University, Center for Graduate Study in Richland, and the University of Washington would allow for: visual information exchange; computer data exchange; increased use of voice communication; and, experimental programs exploring fields of cooperation between libraries.
3. Connections in Richland (Center for Graduate Studies and Battelle Technical Library) would allow for information accessing that would benefit WSU programs at the Richland Center and in Pullman.
4. Development of a network system between libraries in Washington will be a fact in the future. It has been proposed that a mini-network utilizing the proposed system as a test-bed be developed. It is recommended that the Washington Library Development Council Mini-Network Steering Committee be requested to provide:

- a. Its current endorsement that the Mini-Network as an experimental model of a state network is still valid.
 - b. An indication of functions that might be performed on the system assuming interconnections included the UW, WSU, and the State Library.
 - c. Predictions of potential funding for such an experimental-demonstration system.
5. It is recommended that elements of a library network, such as facsimile transmission and two-way video-tape communications, be tried between library operations on the WSU campus.
 6. It is recommended that workshops be funded to provide personnel to be affected by the library uses of the proposed system experiences with facsimile transmission, remote reference interaction, teletype requests, etc., so that they may better (1) make decisions regarding functions to be performed on the proposed system, and (2) commence planning for operations in the network environment.
 7. It is recommended that a group be formed to identify costs of library transactions on the WSU system based on costs provided by the carriers and providers of equipment. These costs would be based on traffic studies reported following and the predicted traffic on the system.
 8. Funding for library activities on the system appear to be available from many sources with none of the sources providing full funding. The seeking of funding for library uses of the system should be an integral portion of the fund seeking activities for the full system but library representatives should be involved in the activities.
 9. WSU should consciously make an effort to inform other users of the proposed multi-purpose communication system of the implications to libraries. The University Relations Office could assist in preparing news releases and preparing presentations on the library applications of the proposed system.

Statistics on Traffic

The following statistics were prepared for the Library Subcommittee as it examined the existing traffic of printed material from the library.

Figures for a four month period in 1970:

- | | |
|--|-----------|
| 1. Phone calls made by the public service department to the University of Washington Library | 65 (est.) |
| 2. Loans and Photoduplications in lieu of loans requested from the University of Washington | 281 |
| (Loans 68) | |
| (Photodups 213) | |

3.	Loans and Photoduplications in lieu of loans requested from State Library	3
	(Loans 2)	
	(Photodups 1)	
4.	Loans and Photoduplications in lieu of loans sent to the University of Washington	243
	(Loans 14)	
	(Photodups 129)	
5.	Loans and Photoduplications in lieu of loans sent to the State Library	725
	(Loans 5)	
	(Photodups 720)	

The Audio-Visual Center could also be a user of the proposed system in the following manners:

1. Displaying motion pictures via the video system.
2. Conferences and interaction with WSU staff at remote locations (i.e. USDA extension in Seattle or Puyallup)
3. Conducting in-service workshops for non-WSU staff on the two-way system.
4. Issuing of requests of materials, non-print in nature, to satisfy needs of the WSU patrons.
5. Accepting booking requests from non-WSU patrons to access our materials.
6. Expansion of the now-used audio network for in-class use.

It is not possible to predict the number of audio-visual items that could be displayed via the system or loan requests that can be transacted until specifics of locations and communication equipment and subsystems are known. Predictions with identified alternatives can be offered when the system is more precisely defined as it will function beyond the video communication capability.

House Concurrent Resolution #20

On December 14, 1970, the Joint Committee on Education of the Washington Legislature issued Libraries in Washington: A Report to the Washington State

Legislature by the Subcommittee of Educational Television and Libraries.

Contained in this report, among other things, is a review of the library network developments for the state and a copy of the Mini-Network Proposal which reviews the WSU multi-purpose communication system. In addition, a series of recommendations are presented which became HCR 20. HCR 20 was passed by the legislature and will be implemented prior to its regular 1973 session.

It is probable that the Legislative Council will seek the assistance of the Washington State Advisory Council on Libraries to work on aspects of the study called for in HCR 20. The WSACL is embarking on a long-range planning project which parallels the study(s) called for by HCR 20. Funding for both studies is available. Personnel from the WSU Library will be involved with these studies.

Library Services and Construction Act

The library portion of the proposed WSU system is of significance to developments now underway as part of existing or proposed LSCA projects. Implications of this act need to be examined and proposals for sections dealing with personnel development, demonstration projects, or experimentation processed through the LSCA project officer.

Program for Seeking Funding

A portion of initial funds for system development will come from non-local sources. It is suggested that a team of two be released from regular duties for two months to travel and meet with representatives of associations and agencies that might have interest in a segment of the total system. In meeting with library personnel it became evident that many little catches of monies were available for specific, little in themselves, tasks. But when these little catches of money are combined it may be possible to fund the development of the system.

These two individuals would lay the basic ground work and identify the innumerable agencies or associations that will receive proposals. They would give this information to proposal writers who would create and coordinate the proposal--writing phase of the project.

MEMORANDUM

TO: Jim Hardie, Coordinating Chairman, Study of a Multi-Purpose Communications Network.

FROM: Jerry Brong, Chairman, Library Sub-Committee 

DATE: December 16, 1970

SUBJECT: Library Sub-Committee Status Report.

Sub-Committee Activities since October 9, 1970, Report.

Recently in the Tri-Cities I took the opportunity to review with Wayne Snyder, Director of the Battelle Technical Library (assumed the Directoriate following the retirement of Chris Stevenson), our activities to date. Snyder will work with our sub-committee and he reconfirmed that the Battelle Library desires involvement with the system.

Conversations in Pasco with Byrdean Vickery again pointed out the inability of Columbia Basin College to now allocate funds for library use of the proposed system. Library use of the system would be one of, primarily, receiving rather than providing materials.

Services desired at CBC might include:

- Facsimile transmission of inter-library loan materials.
- Teletype transmission of inter-library loan requests, film booking, or other library data.
- Reference service for librarians at CBC.
- Display by TV of motion pictures from the WSU collection.
- Inservice training experiences for CBC staff in use of library resources.
- Access to bibliographic data for cataloging of acquisitions, location of materials, or materials selection.

(These potential services for CBC should not be grossly different from services desired by other community colleges.)

December 10 a meeting of the 4 Pullman members of the Sub-Committee met to review current developments and formulate interim recommendations.

Interconnection with points in Seattle and Olympia.

As stated previously, services to Seattle (UW) and Olympia (State Library) would provide desirable interlibrary communication capabilities. In addition to the interaction with Bill Hevley, Director of CCTV for the UW, who is coordinating UW's study of the proposed system, our sub-committee is establishing liaison with personnel at the UW Libraries. The UW Library Sub-Committee should be named within 2 weeks.

Liaison will, further, be established with the State Library.

As a combined effort these new committees will define functions to be performed for libraries on the proposed systems. Attempts will be made to identify sources of funding.

This inter-institutional committee will provide input and possible proposals to the Washington State Library Development Council Mini-Network Steering Committee at its 1-16-71 meeting. (The mini-network committee is examining the proposed system as a test-bed for the developing State Library network.)

Interim Feasibility Report and Recommendations.

(Findings prior to consideration of interconnection with Western Washington.)

1. Library communication via electronic networks (data exchange, facsimile, voice communication, video exchange, teletype, and visual display of hard-copy records) is possible and desirable as a means of increasing access to information.
2. Connections in Eastern Washington (excluding Richland) would function for providing services to other than WSU -- WSU Library would be an out-put source. Service to the UW and State Library would be productive for all parties.
3. Connections in Richland (Center for Graduate Studies and Battelle Technical Library) would allow for information accessing that would benefit WSU programs at the Richland Center and in Pullman.
4. Costs of library traffic on the system can not be computed without knowing system costs. Cost predictions is further complicated by the fact that no multi-use system as proposed has been used for library information exchange.

5. Precise needs of the Center for Graduate Study Library, as might be met by the proposed system, have not been examined.
6. Development of a network system between libraries in Washington will be a fact in the future. It has been proposed that a mini-network utilizing the proposed system as a test-bed be developed. It is recommended that the Washington Library Development Council Mini-Network Steering Committee be requested to provide:
 - A. Its current endorsement that the Mini-Network as an experimental model of a state network is still valid.
 - B. An indication of functions that might be preformed on the system assuming interconnections included the UW, WSU, and the State Library.
 - C. Predictions of potential funding for such a experimental-demonstration system.
7. It is recommended that elements of a library network, such as facsimile transmission and 2-way video-audio communication, be tried between library operations on the WSU campus.
8. It is recommended that workshops be funded to provide personnel to be affected by the library uses of the proposed system experiences with facsimile transmission, remote reference interaction, teletype requests, etc., so that they may better (1) make decisions regarding functions to be performed on the proposed system and (2) commence planning for operations in the network environment.

TO: Multipurpose Communications Network Sub-Committee Chairman
 FROM: Jerry Brong, Library Sub-Committee Chairman
 DATE: October 9, 1970
 SUBJECT: Status Report on LIBRARY SUB-COMMITTEE

Sub-Committee Membership

Betty Roberts, WSU Science Library
 Joselyn Druschel, WSU Technical Services Division
 Bill Gnaedinger, WSU Library Associate Director
 Chris Stevenson, Battelle-Northwest Technical Library
 Brydean Vickery, Librarian, Columbia Basin College

Sub-Committee Activities, To Date

The committee met May 13 in Pullman -- prior to and following that time the Sub-Committee exchanged ideas via mail and telephone. Plans do not now exist for a meeting this fall, however the Sub-Committee has not been deactivated.

Problems and Prospects

For the most part, the Sub-Committee viewed the proposed system as a means for carrying on present inter-library communication functions, but in a more expedient way. The Sub-Committee did see the use of the proposed system as a test-bed for exploration of library functions that might be performed in a "network" configuration.

Monies to pay for the project were not found by this Sub-Committee. Suggested sources to be explored:

Western Interstate Compact for Higher Education
 National Science Foundation
 Pooled Resources Between Institutions
 Ford Foundation
 Carnegie Foundation
 Kellogg Foundation

As chairman, I feel that the Sub-Committee as constituted, talked to itself about potential services. We failed to move out to the library users.

Multipurpose Communications Network Sub-Committee Chairman
Page 2
October 9, 1970

The State Library Mini-Network Steering Committee is to meet again this fall, receive a status report on the WSU proposed system and make decisions about the demonstration system. I propose two things:

(1) Provide for the State Library Mini-Network Steering Committee a written status report on the proposed WSU system. Provide predictions as to turn-on dates, define service areas, and propose use costs.

(2) Allow this Sub-Committee to work further to identify specific services and funding sources for library activities. This might be accomplished by involving a representative from this Sub-Committee with the other operating Sub-Committees.

ADMINISTRATIVE SUBCOMMITTEE

John A. Davis, Chairman

MEMORANDUM

TO: Dr. John A. Davis, Chairman
Administrative Sub-Committee
for a Multi-Purpose Communications System

FROM: James W. Hardie

DATE: April 29, 1970

SUBJECT: Mandate for Sub-Committee Study

I am very pleased that you are willing to accept the chairmanship of this important study area. Your committee work will require considerable creative effort. You are free to select your own committee members. If you would like assistance in contacting potential committee members, we would be glad to do so. Suggestions as to possible areas of representation you might like to consider for your committee are: (1) Computer Science, (2) General Services, (3) the Office of the Vice-President Finance, (4) someone quite knowledgeable in writing of project proposals and funding sources, and (5) a person from the registrar's office.

There will undoubtedly be the need to coordinate your committee work with the efforts of the other sub-committees.

The specific mandate for your committee is as follows:

1. Develop an operational model for the administration and operation of the proposed system. The model should include:
 - (a) The identification of functions to be performed for successful systems operation.
 - (b) The personnel requirements.
 - (c) A system model for scheduling all types of uses and applications of the proposed system.
 - (1) Develop a proposed procedure for resolving scheduling conflicts, priorities, pre-emptions.
 - (2) Detail a typical daily, weekly, monthly and semester year.
2. Identify back-up support requirements, such as from graphics, video tape production for demonstrations, etc. Estimates of man-power requirements for such back-up capability should also be identified.

Dr. John A. Davis
Page 2
April 28, 1970

3. An analysis of space requirements, power and special plant facilities, not included in proposal.
4. A model for an in-service faculty and staff development program to meet required levels of competencies in working with this system should be developed.
5. Develop the mechanics for a system to handle registration and course credit problems as they may involve inter-institutional relationships, and billing procedures for users.
6. Recommend vender support requirements.
7. A cost-effective study should be conducted from the simulated information developed.
 - (a) simulate costs at various levels of use for the system, calculate break even point, and optimum use levels.
 - (b) simulate cost comparisons with alternative methods for meeting instructional or communication recognized and legitimate needs.
8. Examine potential sources of funds and develop a proposed method of cost sharing by departments and between institutions.
9. Define guidelines for initial facilities implementation and for system growth and expansion of the system.

I would appreciate very much your report by June 1, if possible, to give our Committee time to finalize our report to Dr. Beasley by July 1. If the University is to make a substantial commitment to the establishment of the proposed microwave network, it can only do so on the basis of a thorough understanding of its uses, needs, fundings and identification of the full implications of using such a system.

J. Reginald Miller, Arnold Gallegos, and I make up the coordinating committee for conducting this depth study analysis. We want you to know that we stand ready to assist and work with you in any aspect of your Sub-Committee work.

Administrative Subcommittee: John A. Davis, ChairmanAdministrative and Operational Functions to be
Performed to Insure Successful Operation

Beyond the obvious general administrative responsibilities such as program planning, budgeting, supervision, and evaluation, certain functions of an administrative nature are essential to successful hour-by-hour operation of a multi-purpose communication system. These functions embrace the logistics of system operation. The following scheduling and coordinating functions are included in each use of the system:

1. Scheduling time allocations for each user
2. Scheduling channel(s) and distribution arrangements for each use
3. Scheduling facilities at each connection point
4. Scheduling special materials at appropriate locations
5. Scheduling special equipment if required
6. Scheduling any technical or back-up personnel required

While projected uses of a cross-state multi-purpose system may become sufficiently complex that a computer is required, it is felt that procedures already established for handling the logistics of class and audio-visual scheduling can be adapted to provide support for the pilot system. All forms and procedures necessary for scheduling facilities, equipment, materials, personnel, and special distribution arrangements are operational daily within the WSU Audio-Visual Center

Should the logistics problems of the communication system prove too complex for established procedures, recourse can be taken (1) to the methodology of the University Registrar in scheduling instructors, students, and facilities, and (2) to procedures worked out in other established multi-purpose communications systems, such as the Indiana Higher Education Telecommunications System.

Identification of Personnel Requirements

The basic concept of the two-way television aspect of the cross-state communications system is that it is simplified and automated for operation and control by the instructor who initiates the communication. A typical operation of the originating point of a two-way televised session may be described as follows:

The instructor arrives at the teaching station a few minutes prior to the end of the preceding instruction period. As soon as the preceding instruction is over, a "class break" slide is shown on the system, while the instructor readies his teaching materials. At the start of the class, the instructor switches on the desired classroom video monitors and audio system.

The instructor begins his class. He faces a camera mounted with the classroom monitors (see Fig. 1) so that he appears to have eye-contact with each viewer. By remote control, he may zoom to a close-up of himself, or to a shot which includes a guest speaker. By pressing appropriate buttons, he may run a video tape, slide projector, or tape recording. He may elect to run a videotape without sound and add his own live narration. At any time he may stop or reverse the tape or slides to recap a point, answer questions, or emphasize some detail. To work out calculations he uses a writing pad viewed by an overhead camera.

As the class proceeds, discussion between the instructor and the remote students takes place just as in any other classroom situation. Communication may be visual as well as spoken.

From the student view, the instructor or his visual materials appear on all classroom monitors. In a discussion the instructor may select a classroom camera which he desires to be operational so that all may see who is talking. To answer questions of random origin, from two or more remote classrooms, the instructor has full time audio channels from each classroom.

From the detail of this description it should be obvious that no "studio" situation with camera operators, microphone operators, floor manager, etc., is envisioned. The pre-recorded materials will be done by the same personnel who support other operations of the Audio-Visual Center.

Additional personnel required by the Communications System will serve two functions: (1) scheduling, and (2) maintenance. It is estimated that, at least during the pilot phase of the project, scheduling coordinators would be

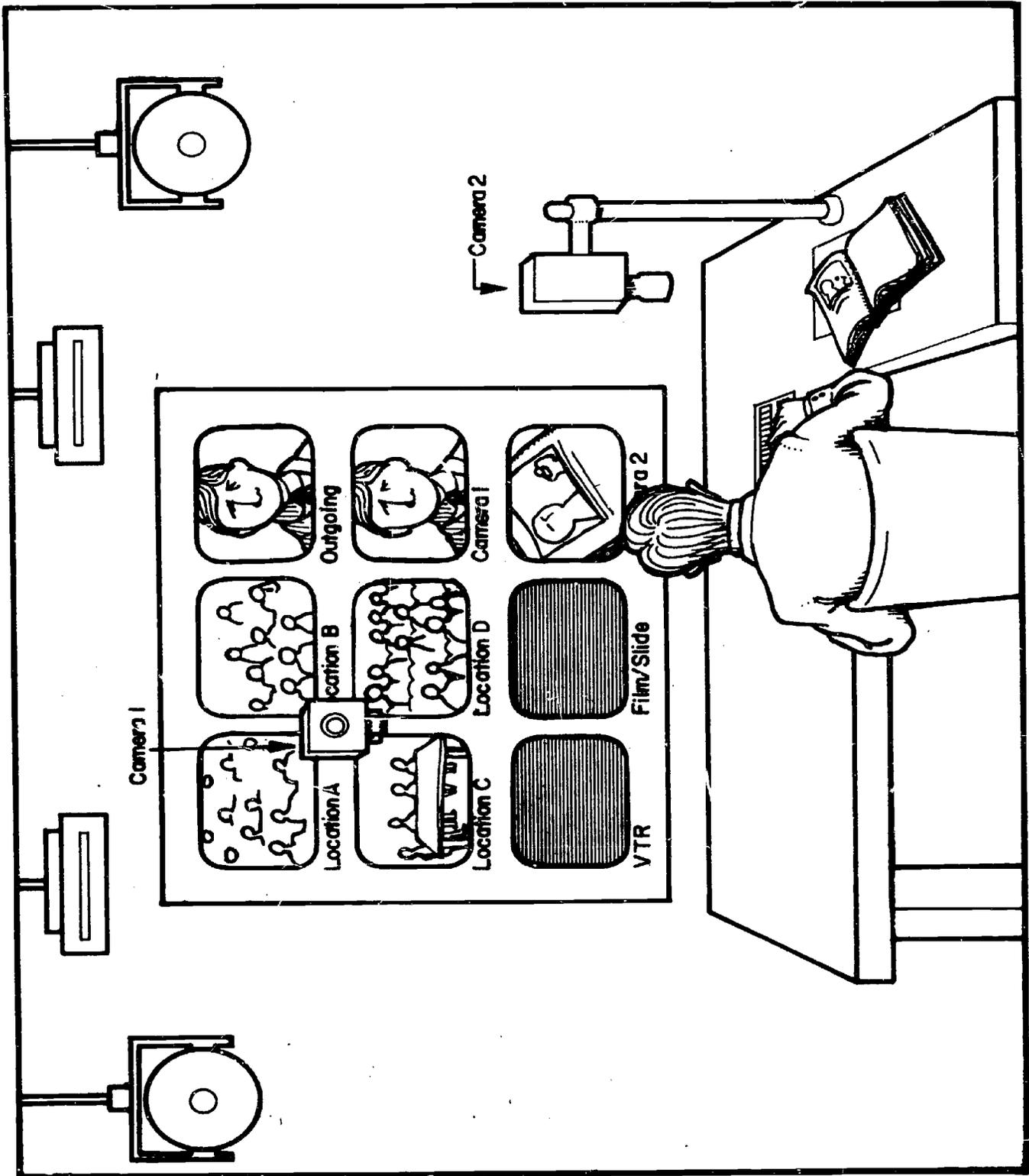


Figure 1: Communications Center

required only at the principal originating points on the system. If the system initially linked the WSU campus with Spokane, Richland, and the University campus at Seattle, personnel at the two Universities could carry out all schedule coordinating functions for the network. Similarly, maintenance operations could be based at the two Universities, utilizing specially trained personnel attached to the institutions' closed-circuit television services. However, arrangements for rapid repair service at other points on the network would be essential. Alternative approaches to this problem might include appropriately-equipped mobile repair units, or contractual arrangements with trained servicemen at each network originating point.

Problems Relative to Scheduling Use of the Communications Network and Suggested Methods for Resolving Them.

Principal problem at this writing is lack of knowledge of the proposed system's channel capacity, switching speed and capacity, exact number of connection points, and variety of potential users. Thus the content of this section will be a listing of the variables of this kind which impinge upon scheduling of the network.

1. One possible configuration for network use would be its employment for multi-campus instruction of regularly scheduled courses. If this were the dominant use, scheduling could be handled by an individual using a simple matrix plotting channels, drop-points, etc. against hours or half-hours of the day for all regular instruction time during a quarter or semester. Transmission of other kinds of information, such as data or facsimile exchanges, could be scheduled into available blocks of time on a comparatively informal basis. If the unit of time for scheduling were half-hour blocks, manual scheduling would probably require a fresh page for each day, perhaps organized in groups of weeks. The projected minimum use shown in the table in the report of the Academic Subcommittee averages approximately 160 hours use per week for "regular" instruction. This would amount to more than twelve hours per day scheduled tightly on two duplex channels. If one assumes that actual full-time scheduling for "regular" courses would amount to no more than half of the hours predicted, the traffic could be accommodated during typical business hours (9:00 a.m. to 5:00 p.m. Monday through Friday) on two duplex channels, with all other times available for such uses as short courses, conferences,

non "regular" seminars, and the like. What is more likely is that some of the "regular" course uses might be scheduled at hours other than nine-to-five, making channel space available for day-scheduling of non-regular events.

2. If utilization of the network for short-courses, seminars, meetings, and continuing education were the dominant configuration, scheduling on the basis described above would become considerably more complex. Fresh schedules would have to be plotted for each week, rather than semester or quarter. The range of use hours would likely include more early-morning, late-afternoon and night hours. Virtual reservation of channels, perhaps the entire network, could be anticipated for conferences and short-courses for blocks of time extending over several days. Broadband, high-speed transmissions of data or other information would be scheduled for less-used blocks of time, such as the noon hours.
3. Consider the possibility that the network could be dominated by non-instructional uses. These might include data exchange between the Universities' computers, on-line computer ties, transmission of library information, telex and teletype, use of the channels for remote originations for the institution's broadcasting stations, and a vast amount of conceivable administrative and research activity. Given switch gear capable of instantaneously converting entire broadbands from television to data transmission, high-speed data exchanges between the Universities' computers could be carried out in seconds. Scheduling units this small greatly increases (a) possibilities for maximum utilization of the network and (b) the variables with which the scheduler must cope. (This begs the question of whether the Universities' computer systems have enough compatibility of language, etc., to be able to carry out direct data exchanges.) If, on the other hand, the network's facilities for broadband switching are not high-speed, broadband data transmissions would best be scheduled for non-television hours, e.g., 11:00 p.m. to 6:30 a.m. Sidebands could be reserved during the day for data, facsimile, teletype, and voice transmissions between the participating institutions. This approach would suggest separate scheduling of the sidebands.
4. An additional possibility to be considered is the utilization of the network for dedicated telephone capabilities. Given an average of 12 voice channels available in sideband for each television broadband, a network of three duplex TV channels cross-state would provide 72 potential voice channels. Without multiplexing, each channel would be limited to one-way transmission. However, even 36 two-way circuits compare favorably with the capacity presently afforded the Universities through the State Controlled Access Network of telephones. Dedication of the voice-channels to an automated telephone system would simplify scheduling of such facilities.

For pilot purposes in which the network interconnects only a few points, it is anticipated that scheduling of regular instruction, conferences and short-courses, continuing education activities, and research or administrative activities

could be executed manually by scheduling coordinators at the principal originating points. All broadband transmissions could be scheduled on a matrix plotting channels and drop-points (campus; rooms within the campus) against half-hour time segments for all available transmission times during a day (one page per day). Times never used for television transmissions, such as night/early morning hours, could be scheduled with broadband data and facsimile transmissions, or distribution of audio-visual materials on a one-way basis between points on the network, when such is needed. If developments of network utilization indicated a load or cost-effective justification for more sophisticated scheduling, in units of seconds or minutes rather than half-hours to accommodate high-speed switching between different broadband transmission functions (e.g. TV to data), resort to computerized scheduling would be indicated.

Back-up Services Required to Support Users of the System

In addition to the scheduling and maintenance personnel indicated above, some increased demands for obtaining or developing materials such as films, slides, graphics, or tape-recordings can be anticipated. In the pilot phases of the program, these presumably can be accommodated by existing personnel and procedures. An increased demand for well-executed locally-made graphics materials, added to the already heavy workload of the Graphics Laboratory, would add weight to the justification for additional staff for that unit.

The most significant sort of "back-up" service, especially in pilot phases of the program, is in the form of allowance for released time for faculty who undertake to utilize the communications system for innovative instruction or regular or special courses or for research activities. As an average, perhaps one hour for each hour of use will be needed for extra preparation--planning of special graphics or other visuals, video taping of special demonstration

materials, orienting guest lectures, etc. Many class or conference sessions will be conducted virtually as they are in face-to-face situations, with about the same amount of advance preparation. But the requirements and opportunities presented by electronic communication will place occasional extraordinary time demands upon participating instructors which, it is estimated, may be embraced by an average of one hour of released time for each scheduled hour of network use.

Space Requirements and Special Plan Facilities

The communications system as now envisioned would be a multiple-purpose facility providing one and two-way television communications for instructional, conference, or individual communication between two or more points on the system. In addition, the system should provide for other modes of communication simultaneously via voice, teletype, facsimile, or data transmission.

Electronic distribution of information within the localities associated with the network will be dictated by the local needs and functions the network serves. On the WSU campus, interface of the network with the University's two-way CCTV distribution system would provide the potential of origination and reception of televised information for any of more than a dozen classroom buildings. At Spokane, network interface might take place only at the Extension Center, or by tie-line to the hospitals and colleges. In the Tri-Cities, the Joint Center for Graduate Study would be the principal interface point. In Seattle, program needs might dictate television and a computer interface at one of the Community College campuses, facsimile connections at Seattle Public Library and the University Library, and TV ties to the Health Sciences area as well as other areas of the University campus.

For two-way television purposes, two kinds of facilities are foreseen. These include comparatively simple adaptations to small classrooms and conference/seminar rooms, a specially designed facility for "lectures" and general communication.

The classroom and conference/seminar facilities would provide a 23-inch television receiver (probably color), TV camera, modulator, audio amplifier, and microphones appropriate in number and placement to provide optimum audio coverage at all points in the room. The television receiver, with the camera alongside, would be permanently mounted at a ceiling corner location, as shown in Fig. 2. A wide angle lens on the camera covering an arc of approximately 60 degrees would facilitate sight and sound communication by all seated within the area covered. Ceiling-mounted microphones and audio and TV controls located in a lockable cabinet, would facilitate both operational simplicity and security of equipment. The camera should be capable of operating well in available classroom lighting. Acoustic considerations such as upholstered chairs and carpeted floor would be highly desirable for acceptable audio communications. Classroom, seminar, and conference rooms suitable for adaptation to this arrangement have been identified by faculty in several departments on the campus.

The special "lecture" facility, which may be called a communication control center, is designed to fit into a room not less than 10 feet by 14 feet. The facility is conceived for operation by a single person. Each control center would contain a desk with built-in switching panel and remote control facilities for zoom lens and direction controls for one of the two cameras in the system. The switching panel should include enough switches to provide for growth in the system accomodating additions such as videotape recorder, film chain, and additional classrooms. One of the two television cameras would be

**Example of a Classroom
Two-Way Television
Arrangement**

**Television Set & Camera
(Camera could be on top
of or below receiver)**

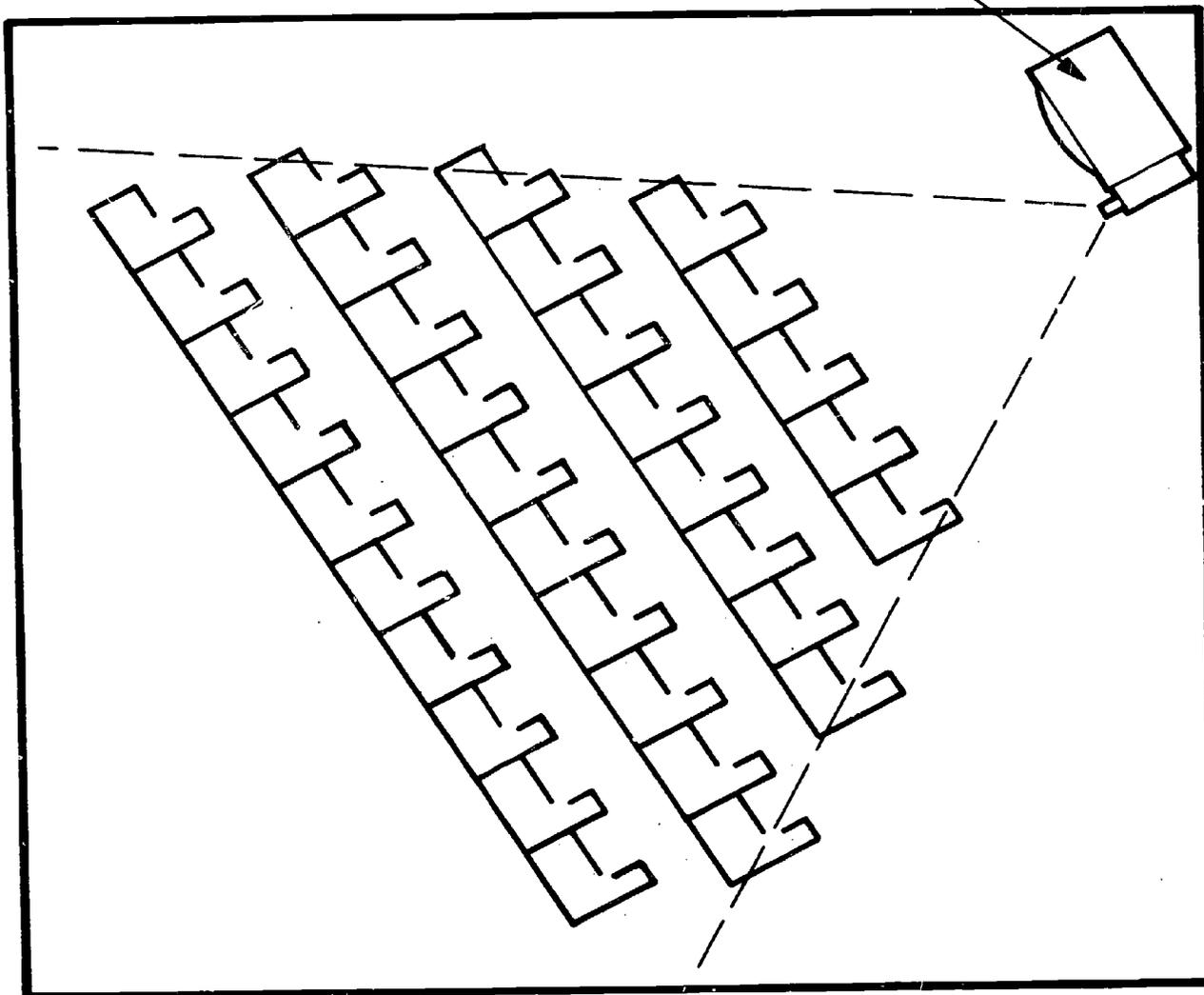


Figure 2

used an an overhead camera for display of written materials, books, objects, and graphic materials. This camera would have a zoom lens to enable the instructor to vary the size of the display area.

The second camera (probably a color camera) would be mounted in the midst of rack-mounted television monitors approximately eight to ten feet in front of the teaching desk. The rack would be on rollers to allow easy movement or adjustment. The television monitors would provide display of the incoming pictures from remote classrooms. This second camera would have a remote control zoom lens system, and a pan-and-tilt remote control capability. Both cameras would be driven by a common external sync generator meeting EIA specifications.

The instructor's console could have a Kodak Carousel-type 2x2 slide projector on a sliding rack mounted under the teaching desk. It would project via mirror onto a translucent screen surface mounted flush with the top of the desk. The location of the translucent screen would be in line with the center of the viewing area of the overhead camera. This installation would allow the use of 2x2 slides, or provide back illumination for overhead projection transparencies. Incoming audio would be switchable from a small speaker at the desk to miniature single earphones.

The instructor would be able to observe each classroom at each location on a monitor in the control center. For four locations or four classes, there would be four monitors for viewing each classroom simultaneously.

The switching system would be designed to allow the instructor to call on any student at any of the locations, and by "punching-up" the incoming signal from that classroom, cause it to become the outgoing signal to the other three classrooms. Students in the other three classrooms would be able to see and hear comments made in any one of the classrooms. The system should be

designed so that the classroom being seen by the other class groups would continue to see the instructor at the control center on their television receiver, rather than see their own picture.

Facilities in the room housing the communications control center would necessarily include adequate power, light level, acoustic treatment of sound reflective surfaces, and ventilation to handle the heat from the several monitors and other electronic equipment.

A representation of the proposed control center arrangement is shown in Fig. 1. Space for such facilities has been identified tentatively in buildings in the College of Agriculture, the College of Engineering, the College of Sciences and Arts, and the University Library.

In-Service Faculty and Staff Development Program

A recommendation that the University seek a grant for a model in-service development program appears as a part of this report's summary and recommendation. The program would serve three functions: (1) it would provide opportunity for testing prototype equipment in functions ranging from two-way CCTV to Facsimile Transmission; (2) it would enable us to try out and perfect administrative, operational, and maintenance procedures; and (3) it would provide staff, faculty, and students with direct experiences in using a multi-purpose two-way communications system in instruction, research, and other functions.

The basic program is envisioned as being contained entirely on the WSU campus in Pullman. Prototype equipment would be sought from a potential cross-state system vendor, operational funding perhaps a small grant from the Regional Office of USOE. Exploration of total communications capabilities could be carried out linking classrooms at various points for two-way televised communication, either from classroom to classroom or from control center to classroom.

Immediate potential courses for such treatment have been suggested by faculty in such departments as Animal Sciences, Chemistry, Pure and Applied Mathematics. Procedures and equipment for Facsimile Transmission could be tested between the main library and branches in Education and Veterinary Medicine. Data transmission could go from the computing center to the Library, the Administration Building, the College of Agriculture, and the College of Engineering.

It would be desirable, in planning this model program, to extend the system as quickly as possible to include at least some points in Spokane. Our knowledge of potential problems in scheduling, maintenance, and operation beyond the Pullman campus will be inadequate until we have some experience in multi-purpose telecommunication between cities. The lessons gained from experiences in teaching by amplified telephone and electrowriter are limited in their generalizability for purposes of the multi-purpose communications system. Again, immediate potential users are waiting for the opportunity to try the system in their areas--Nursing, Pharmacy, and possibly Chemistry have specific needs already identified.

Registration and Course Credit Problems

It was found that plans for the inter-institutional cooperative registration were not readily reducible to a model at this time, as specified in the charge to the committee. Relations with the Community colleges (described in the report of that subcommittee) have not moved to the point where this is a suitable topic for discussion. The entire issue is further complicated by the question of semester versus quarter credits--a problem likely to elicit change on the part of one or more campuses.

Evidence of Cost-Effectiveness of Use of a Multi-Purpose
Communications System as Compared with other Methods
for Meeting Recognized and Legitimate
Instructional or Communication Needs

Let us assume that a teaching faculty member of the WSU Faculty is called upon to participate in a meeting in Seattle in the middle of the week during the regular school year. At no additional expense to the University, his classes are covered for two days (one for the trip over by car, one for the meeting and return the same day). If the meeting is at 9:00 a.m., it is likely the professor will depart Pullman via University pool car the previous afternoon, stay overnight in Seattle, and plan to return to Pullman after the meeting and lunch. Probable time (and per diem expense) involved, 36 hours--12 of which are spent in driving during what are normally professional productive hours. If the professor's salary were computed as an hourly wage of \$7.50 (about average for an Associate Professor), one can see that the University will pay \$90.00 of his salary as driving wages. (This is less than the average union wage for a driver, but the professor is probably not a union driver.) The pool car expense for a trip to Seattle and vicinity (in-city driving to the specific destination), together with incidental expenses such as bridge tolls and parking, will approximate \$45.00. The professor's per diem expense will be \$22.00. Total cost for this professor's participation at this meeting will be \$157.00

Suppose the professor can only afford one day away from campus. Then he will probably book a commercial flight from Pullman to Seattle, departing at 6:00 a.m. and returning at 8:00 p.m. Cost of the airline ticket is \$60.00. Rental car from airport to destination and return is \$15.00. Per diem is \$8.50. Non-productive time, assuming one can read or write on the plane but not while driving will be 3 hours at \$7.50 or \$22.50. Total of these figures

is \$105.50. Of course, if it were necessary for the professor to stay over because of flight connections, the figures for per diem, driving, and "non-productive time" could increase.

If the professor were able to attend the Seattle meeting via two-way television, the cost to the University could be computed on the assumption that this were the sole activity on one duplex channel for the period 9:00 a.m. to 12:00 noon. If the system tariffs at \$333,180 per year, assuming its two duplex channels are available at every hour, the cost per hour for 8,760 hours is \$38,034, or \$19.02 per duplex channel hour. The University thus invests \$57.06 for the three channel hours the professor will be using this means to participate in the Seattle meeting. No professional productive time is spent in transit, no per diem required. Several professors, or even a classroom of students, could as easily participate in the meeting along with the professor at no additional cost to the University.

Continuing Education Uses

Continuing Education short courses are presently offered through the extension programs in the College of Engineering and the College of Agriculture both on and off-campus. The Agriculture offerings run from one to five 8-hour days (average two), with tuition ranging from \$3.00 to \$20.00 to cover costs of facilities, materials, publicity and publication, and travel for non-extension personnel. The Engineering short courses average three days, but they are moving toward lengthier offerings which will pay honoraria to special instructors. Their tuition is nominal for state or municipality agencies (\$30.00 will include three luncheons, a banquet, and a copy of the published proceedings), and more for professional groups. Tuition income defrays costs of facilities, publicity and publication, and administration.

In comparison, the correspondence courses offered through the General Extension Service consist of 16 to 32 lessons plus two examinations, and cost each participant \$18.00 per credit hour. A typical course consists of 24 lessons plus examinations for three hours of college credit, at \$54.00. However, the same agency offers at least one 18 session course with no credit, for \$54.00. The same fee structure applies for college-level courses taught off-campus through the General Extension Service.

The expenses which tuition defrays include payments to the instructors who write and grade correspondence courses, and pay for time and travel by instructors who teach off-campus courses. To meet the necessary expenses of an off-campus course, enrollment of at least 23 students in Spokane is typically required; in Richland, 37. A three credit hour correspondence course is probably paid for when 30 students have taken it.

Let us assume that a continuing education short course is planned for offering via the multi-purpose communications system. It is to be a three-day non-credit course, available to participants at all major drop-points on the network--Spokane, Pullman, Richland, and Seattle. The students will be charged the Regents' approved rate for a two-credit hour course (16 one-hour sessions), \$36.00. The instructor will be paid the average rate paid by General Extension for off-campus courses, \$17.00 per "contact" hour; there will be no travel and per diem cost.

For their money the participants will actually receive more than the 16 hours implied in their fee, say 18 hours at six per day. Of course, group luncheons, banquets, and "happy hours" are missing from the course; so is the cross-state travel. The University's costs include 18 hours of network time at \$19.02 per channel hour, or \$342.36. The honorarium to the instructor at the rate designated will be \$306.00. Conservatively estimating administrative

costs, including proceedings publication, at \pm 20%, add \$131.64. Total cost for the short course, \$780.00. Number of participants necessary to defray costs, 22. One could anticipate five registrants at Richland, perhaps seven in Spokane, and another 10 at Seattle. Any in excess of these would provide monies for further development of programs or for other network expenses.

A conventional length continuing education course offered via the network would realize some advantages over the present mode of operation. Instructors would be easier to recruit, since they would not have to waste productive time in travel. Classes could be offered at locations otherwise unable to enroll enough registrants, since a few students at each location could take the course simultaneously via two-way television. Assuming system costs of 45 class hours at \$19.02 per hour, the system would cost \$856.00, the instructor's pay for contact time at \$17.00 per hour would be \$765.00. An additional 20% for administrative costs--which should cover materials, syllabi, etc.--brings the total cost of the course to \$1,945.00. Total number of registrants required to defray the costs, 36. This compares favorably to the 37 students necessary to offer the course in Richland alone.

It must be observed that the network costs in the foregoing illustrations account for line and switching costs exclusive of equipment operation costs at either end of the transmission. It is assumed that these costs would be absorbed by the participating institutions at each point. If, on the other hand, it were necessary to pay additional charges, such as a service charge at Spokane for a WSU-originated course, this cost would be added to the computation. Perhaps a round figure of \$400,000 per year (\$45.66 per hour) would cover more contingencies in figuring costs than the \$333,180 per year (\$38.03 per hour) cited earlier for two duplex channels. For the professor using the system to attend a Seattle meeting, the cost would then be an additional \$11.06,

or a total of \$68.49. The cost of 18 hours of network for the short course would be \$410.94, raising the total cost of the short course to approximately \$865.00. Total registrants needed to defray costs, 24. To support the costs computed at the higher rate for a semester-long continuing education course, 39 students paying \$18.00 per credit hour would pay the cost of the course, instructor, administration, and communications system.

As one moves beyond two-way television services to other services the system would provide, possibilities increase for trade-off of certain costs. For example, utilization of audio channels to substitute for present telephone calls between Pullman and Seattle and Spokane could account for savings on the phone bill of as much as \$62,000 a year. Use of sidebands for data transmission between the WSU Computing Center and Gonzaga University in Spokane could save nearly \$3,000 per year just for the private line, plus \$1,080 per year for each dataset connected to the switch network. Two-way television communication between the Pullman campus and the Joint Center for Graduate Study at Richland would realize savings of transportation ranging from \$55.00 to \$72.00 per trip for the charter airplane (plus per diem and lost time for the faculty members involved).

Potential Sources of Funds

The report will recommend that the University seek funding for the pilot program from non-state sources, and that the Spokane-Pullman-Richland-Seattle link be considered the first phase of a state-wide, multiple purpose communications system serving several state agencies. Liason with the Office of Program Planning and Fiscal Management and the state's General Administration, has been maintained from the outset, so that the appropriate administrators at that level are cognizant of the intentions of this proposal.

Several professors have suggested that applications for Grant funds be made to the National Science Foundation. The Graduate School suggested other funding possibilities such as the Carnegie Corporation of New York and the W. K. Kellogg Foundation, both of which have funded sizable programs in higher education, continuing education, and inter-institutional cooperation.

Inquiries for the latter funding agencies are as follows:

Carnegie Corporation of New York
437 Madison Avenue
New York, New York 10022

For preliminary consideration, submit a statement describing the proposed project in terms of aims, methods, personnel involved, and amount of financial support required.

Leonard L. White, Secretary
W. K. Kellogg Foundation
Battle Creek, Michigan

Write the Secretary briefly describing the basic problem and plans for its solution. State the objectives of the project, outline proposed operational procedures, including personnel and financial resources available and/or needed. Estimate probable cost and duration of the effort.

Guidelines for Initial Facilities Implementation and for System Expansion

On the bases of (1) identified interests and needs, and (2) probable logical steps in terms of engineering, the following pattern of development is proposed:

1. Prototype system for the WSU campus. Should include at least two communications control centers, locating one perhaps in one of the new Agricultural Science buildings, and the other in Holland Library Building. Nine to 12 classrooms or seminar/conference rooms should be equipped, including perhaps the three new classrooms in the new Agricultural Science Building that have already been surveyed for the location and utilization of two-way CCTV. Other classroom facilities should be located in Engineering, Chemistry, Education. Facsimile links from Holland Library Building to the Education Branch

- in Cleveland Hall and the Veterinary Medicine Branch in Wegner Hall. Data links from Computing Center to the Library, Administration Building, and other logical points for on-line computer communication. Initial phases of a telephone system for use with the voice-communication sidebands may be introduced at this time.
2. Extend the campus prototype system to Spokane, including two-way CCTV links to the Nursing Education Center, Gonzaga University, and the hospitals.
 3. Links to the University of Idaho should be explored by this time.
 4. Extend the system to the Joint Center for Graduate Study at Richland, with ties to the technical library at Battelle Northwest, Columbia Basin College, and other appropriate points.
 5. The final main trunk to Seattle from Richland would complete an initial cross-state communications capability and allow for the development of a multiple number of inter-connects. Undoubtedly an interconnect with Olympia would be an extremely high priority. Undoubtedly the interest and needs of multiple state governmental agencies and institutions will affect the actual development of the eventual total system.

Serving as Resource persons for this committee were:

Ross Armstrong, Institutional Studies
 Robert Board, Graduate School
 Gerald R. Brong, Library Subcommittee Chairman
 Thomas Burgess, Library
 James W. Hardie, Instruction Television Coordinator
 Howard Mount, Controller
 Charles J. Quann, Registrar
 John Sobolewski, System and Computing

FACULTY RIGHTS SUBCOMMITTEE

Walter A. Becker, Chairman

MEMORANDUM

TO: Walter A. Becker, Chairman
Sub-Committee on Faculty Rights
for a Multi-Purpose Communications System

FROM: James W. Hardie

DATE: April 23, 1970

SUBJECT: Mandate for Sub-Committee Study

I am pleased you were willing to accept the chairmanship for this important study area. We are concerned with guide-lines for faculty in utilization of their skills for the proposed network and would like your sub-committee to study the implications of faculty rights in the teaching of additional or new classes via a network; make recommendations on reasonable rates of compensation for such additional work and preparation; regulations on the use and re-use of taped materials and lectures; ownership of such materials; the conditions if such work is done on released time; recommendations on minimum rates of pay; any other implications which your committee feels is relevant.

I would very much appreciate receiving your report by June 1, if possible, to allow our committee time to finalize its report by July 1. We are anxious to get a full study of the proposed microwave network to Dr. Beasley as soon as possible. If the University is to make a substantial commitment to the establishment of such a network, it can only do so on the basis of a thorough understanding of its needs, costs, funding, and other factors.

J. Reginald Miller, Arnold Gallegos, and I make up the coordinating committee for conducting this depth study analysis. We want you to know that we stand ready to assist and work with you in any aspect of your Sub-Committee work. You are free to select other committee members of your choice.

Faculty Rights Subcommittee: Walter A. Becker, Chairman

A subcommittee of the Faculty Executive Committee, appointed May 8, 1969, consisting of Walter Becker, Chairman; John Davis; Robert Grunewald; Antoinette Poulsen; Theodore Saldin; and Calvin Watson formulated the "Policy on Faculty Involvement and Residual Right in Films, Videotapes, and other Instructional Media." Reginald Miller also participated in the deliberations of the subcommittee.

On April 22, 1970, the Faculty Executive Committee submitted the enclosed documents to President Glenn Terrell with the unanimous recommendation of FEC that it be adopted by WSU.

This policy appears to cover the major portion of any faculty's rights involved in the use of the multi-purpose network proposed by this committee. There is not enough information to make a determination as to the faculty's rights involved, if any, in course loads, student credit hour assignments, etc.

If a faculty member carries out professional activities on the multi-purpose communications system over and above his normal load, then he should be paid extra for this service.

**Policy on Faculty Involvement and Residual Rights in Films,
Videotapes, and Other Instructional Media**

1. Public affair shows, interviews, news programs, etc. (Examples: Mosaic, interviews with coaches, Conversation 69) Washington State University may transmit or reproduce by television radio or other means, for local or general distribution, news and general information programs prepared by WSU on which faculty members have appeared.
2. Videotapes, scripts, transparencies, audiotapes, segments of computer assisted instruction programs and films prepared by the instructor with WSU material and equipment for use in a course in which neither released time nor additional compensation is provided for the faculty member.
 - a. WSU retains physical ownership of the materials in the absence of an agreement to the contrary.
 - b. The faculty member has control of the usage of the materials in the absence of an agreement to the contrary.
 - c. A faculty member has the right to have copies made, other than at WSU expense, of his material for outside distribution and/or remuneration.
 - d. When a faculty member resigns or retires, if the department chooses to retain the material, then an agreement shall be negotiated between the department and the faculty member. The agreement shall state the conditions under which the material shall be used and the time limit after which the material shall be erased or discarded. If an agreement cannot be negotiated successfully, then disposition of the material shall be at the discretion of the faculty member.
 - e. If a faculty member dies, the departmental retention of the recorded material shall be negotiated with the estate or the family.

Hopefully, the archival value of material will be borne in mind by both parties in determining its disposition in (d) or (e) above.

3. Courses taught on broadcast or closed-circuit television, computer assisted instruction courses, and other similar instructional system for which compensation or released time is provided for the faculty member(s) and prepared by the instructor(s) with WSU materials and equipment for use in the curriculum of the university will be covered by a contractual agreement negotiated between the responsible faculty member(s) and WSU through the Academic Vice-president which shall include the following considerations:
 - a. "Materials shall be defined to include items such as scripts, videotapes, transparencies, computed assisted instruction programs, audiotapes, and films. "Supplementary materials" shall include items such as viewing guides, workbooks, and laboratory manuals. A responsible faculty member is defined as the person with the primary responsibility for the preparation of "materials."

- b. Compensation and/or program preparation time shall be commensurate with the institutional instructional needs and the necessity of reasonable faculty workloads.
- c. Ordinarily WSU retains physical possession of the materials in the absence of a clause in the agreement to the contrary.
- d. Ownership of the Supplementary Materials resides with the faculty member(s) in the absence of a clause in the agreement to the contrary.
- e. Materials may be used within WSU only with the permission of the responsible faculty member(s) and the sponsoring academic department(s).
- f. Uses of materials outside the institution shall be subject to negotiation with the responsible faculty member(s) and WSU.
- g. Consideration of a reduction in the teaching load of the faculty member(s) shall be given upon occasion of the re-use of materials.
- h. Revision of the material is at the discretion of the responsible faculty member(s); financing of the revision is at the discretion of WSU.
- i. Sharing of remuneration from commercial distribution shall be subject to negotiation with the responsible faculty member(s) and WSU.
- j. When two or more faculty members are involved in the preparation of materials, the use of materials and remuneration shall depend upon agreement among the faculty members. In event of disagreement, the matter shall be submitted to an arbitration panel to be selected by those faculty members.
- k. The agreement shall state the conditions under which the material can be used and the time limit after which the material shall be erased or discarded if a faculty member resigns or retires. Hopefully the archival value of material will be borne in mind by both parties in determining its disposition.

4. Academic freedom.

Nothing in this policy shall be construed as abridging a faculty member's academic freedom in the classroom.

5. Liability.

Faculty members should be aware that they and/or WSU may be held liable in the event of copyright or defamation actions.

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