HISTORICAL DEVELOPMENT OF MINNESOTA'S

INSTRUCTIONAL COMPUTING NETWORK

by

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BACKGROUND

Minnesota education has been rapidly increasing its use of instructional computing. During the past six years, education use of timesharing systems has grown from a few schools using various commerical systems to many schools in the various education systems using a variety of education-owned computer systems.

Minnesota's instructional timesharing during the past two years was provided on a variety of equipment. The bulk of the approximately 450 prots was provided by five Hewlett-Packard 2000's (160 ports), one UNIVAC 1106 (22 ports), and one CDC 5400 (256 ports). The arrangements for receipt and delivery of this service varied. Some education agencies used co-operatives and some agencies had their own equipment. The current plan is for a statewide network having a UNIVAC 1110 as the initial component.

The Minnesota users of instructional timesharing at all levels of education have historically worked together to promote better service through planning and coordinated delivery systems. In 1970 a state-wide plan for higher education was developed. In 1971 the Department of Education (elementary, secondary and vocational) developed a similar plan. The State's Commissioner of Administration, in 1971, established a committee on computers in education to investigate ways of coordinating developments at both levels. Out of these efforts came the MINNESOTA EDUCATIONAL COMPUTING CONSORTIUM (MECC). This organization is to either provide directly or coordinate educational computing services for all levels of education, for all students, and for all educational functions in Minnesota.

Minnesota's instructional computing efforts have resulted in a number of significant projects. Prior to MECC, higher education needs have been met through the Minnesota Educational Research and Instruction TimeSharing System (MERITSS). Elementary and secondary school needs have been serviced by the TIES Project, the Southern Minnesota Schools Compu-ter Project (Mankato Project - SMSCP), and some individual schools having their own equipment. This paper will set forth some features of two of these cooperative efforts, MERITSS and TIES. In addition, the evolution of MECC from these initial projects will be outlined.

MERITSS

MERITSS began operation in the Fall of 1971. This was a result of coordination efforts by the Community College System, the State College System, the University of Minnesota, and some private colleges. Rather than continue buying vendor supplied services, they chose to operate their own. The system was located at and managed by the University of Minnesota. The first users were experienced and thus instructional services support was handled within each institution. Documentation and other educational materials were produced by informal user groups and used by the less experienced who were soon to come on the system. Constantly increasing growth occurred from an initial 32 ports

on a CDC 6400 supplying BASIC, FORTRAN and COBOL to 140 ports serving 250 terminals in 1973-1974 on the same upgraded machine supplying BASIC, FORTRAN, COBOL, APL, ALGOL, MNF, PASCAL, LISP, SNOBOL, and a library of 200 application routines. The users were predominately from levels of higher education. A moderate increase in higher education usage coupled with the statewide effort to provide time-sharing services to all of elementary, secondary and vocational education caused an increase to 256 ports in the Fall of 1974.

TIES PROJECT

The Minnesota School Districts Data Processing Joint Board (usually referred to as TIES - Total Informa-tion for Education Systems) is a cooperative of 44 school districts including elementary, secondary, and vocational schools, serving over 240,000 students. It is governed by a board consisting of 2 representa-tives of each member district. Formed in 1967, it grew from 16 districts to its current size. The project was sponsored partially by Title III funds in the first three years and supported fully by members since 1970. Most of the member districts are located within a 40 mile radius of the computer center.

It was thought initially that the instructional timesharing needs of TIES schools could be handled by the same computer system which was planned to host the administrative data base. However, in late 1969, it began to appear that the system would not support a satisfactory timesharing service and still carry on the data base functions. The staff decided to acquire and manage a mini-based time-sharing system and took delivery in December, 1969, on one of the first Hewlett-Packard 2000 series sys-tems in an educational establishment. The system was heavily used immediately, and a fast rate of terminal acquisition by member schools soon developed. An additional 16 ports was added in the summer of 1970, and additional computer system in 1971, and a third system in December, 1972, for a current total of 96 ports on 3 Hewlett-Packard 2000 series systems.

The only language available on the systems is BASIC. The version available is fairly complete and satisfies the broad range of elementary and secon-dary needs. However, a desire for FORTRAN as a second language for computer classes is evident for advisory committee recommendations as well as a need for COBOL by the Business Education departments. TIES has timesharing simulators of both those langua-ges, but they have been judged unsatisfactory by the users. (Batch COBOL and FORTRAN are available on the TIES B4700 with two day turnaround.) Instruction in assembler language is also accomplish-ed through use of a simulation. A special author facility for the creation of drill and tutorial lessons is available, written in BASIC. The major areas of user applications are Problem-solving, Simulation, Drill, Tutorial, Information Retrieval, and Data Analysis. The public library is maintained and documented, and updated twice yearly. The instructional support staff consists of two co-ordinators who are mainly concerned with inservice instruction and responding to user requests, and two developers concerned with new and enhanced systems in

CAI and CMI. A variety of application programs are available from the systems manufacturer and other sources and the library is continually growing.

The system supports about 250 terminals, mostly Teletype ASR33 but including a few CRT and portable hard-copy devices. Every secondary school has at least one terminal, many have two, and a few have 3 or 4. There are about 20 terminals in use in elementary schools. Computer time is allocated on a monthly basis according to a formula based on two factors, number of students and number of terminals.

As shown by TIES experience, modular expansion can take place without reduced service because moving a new system in does not affect systems already installed. Redundancy of systems also means that instructional computing is rarely 100% down. In terms of effective use of the system, 96 ports on a single system is more efficient than the TIES configuration. That is, a larger continuous block of lines serves more users than the same number of lines in several chunks.

MECC

The Minnesota Educational Computing Consortium (MECC) provides instructional computing service for all of education. This includes Minnesota's private and public elementary, secondary and vocational schools as well as private and public institutions of higher education: community colleges, state colleges and universities. Such a consortium logically follows and flows out of the earlier Minnesota efforts to pool instructional computing efforts. That is to say that the success of MERITSS, SMSCP and TIES weighed heavily in influencing the development of a single computing system for all of Minnesota's educational timesharing.

Impetus for the information of MECC came from many directions. There were governmental pressures for holding down the proliferation of computing equipment while equalizing the opportunity for outstate students to do computing; educators and legislators alike were anxious to see a significant project that exhibited cooperation between all the education systems; and, of course, as more evidence its worth accumulated, the demand for instructional computing capability increased. These pressures resulted in a MECC plan which was funded for two years in May, 1973.

The MECC plan provides for a statewide instructional computing network for servicing all member systems. This service includes central hardware, a comunications network, terminal acquisition arrangements, and support materials development and dissemination. The current 50 port service is accessed by 1000 terminals via an extensive communications network. The computer prots are on a mix of large multi-purpose hardware and smaller special purpose (timesharing) hardware. The communications network uses multiplexors and a variety of telephone company connections (WATS, FX, data lines, etc.). The majority (90%) of the terminals are model ASR33 Teletypes. The other 100 terminals are a mix of many different kinds.

SUMMARY

Minnesota's instructional computing scene is growing and changing. The spirit of cooperation fostered by the pioneer's in the field has been accepted and expanded. The current statewide effort is succeeding in equalizing opportunity for outstate schools to access instructional computing facilities, continuing and expanding cooperation among educational systems, curtailing the proliferation of computing hardware and economizing service through a statewide communications network.