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ABSTRACT

The implementation and effects of a computerized executive network at the seven colleges in the Maricopa County community college system in the Phoenix metropolitan area are discussed. Two themes are emphasized: the "top-down" strategy, and the significance of office automation. The first system installed was the All-in-One system, which permitted executives to use terminals and work with the computer. The office automation system moved from being only a by-product to being the first major system to be implemented. After the computer service department staff had successfully used the system, a deliberate strategy was undertaken to put the executive network in the office of the Chancellor, vice-chancellors, and college presidents--the "top down" approach. Uses of the network by the executives included electronic mail messages, the electronic file cabinet, word processing, and the preparation of graphics. The largest potential use is the ability to access the administrative data files. The additional tools of spreadsheets, personal filing systems, and data based systems are just beginning to be used. Eighteen conclusions of a study on the network are presented, including the following: executives learn the equipment best during a hands-on training session, and executives learn functions of the system on a need-to-know basis. (SW)

THE IMPLEMENTATION OF THE EXECUTIVE NETWORK AT THE MARICOPA COLLEGES

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Exactly one year ago, a new system was implemented at The Maricopa Colleges. It started with the implementation of a terminal in the office of the Chancellor, then the three Vice-Chancellors and the seven college presidents. The purpose of this paper is to describe the effect upon an organization and individuals in a computerized executive network.

First, I would like to give some background on The Maricopa Colleges. In the Maricopa system, there are seven colleges located in the Phoenix metropolitan area. These colleges enroll 70,000 regular college credit students per semester. This makes the Maricopa system the third largest community college system in the country. This enrollment equates to approximately 32,000 full-time students. In addition, there are from 30,000 to 50,000 non-credit and special interest students. The name Maricopa does not have a large name recognition factor. However, the names of the colleges may be more familiar. The seven colleges are: Phoenix College, Glendale Community College, Mesa Community College, Scottsdale Community College, South Mountain College, Maricopa Technical Community College and Rio Salado Community College. Besides large numbers of students, Maricopa takes pride in being a national leader in educational innovation.

During the past one and one-half years, Maricopa has made major strides in computer services. First, a network of six DEC VAX 11/780s were purchased to support the academic process. Most of these machines supports approximately 60 academic users. Because of this expansion in computer resources in the past two years, there has been a 40% increase in enrollment both years in data processing courses. Along with the existing equipment, a Prime and a NAS, the number of terminals available to students has increased from 84 to 400. Secondly, a large number of microcomputers were also purchased to support academics. During the past year, over 300 Apple IIes, over 50 IBM PCs, over 50 TRS-80s and over 50 DEC microcomputers were purchased. These systems are used primarily to support multiple disciplines in an open laboratory situation. Thirdly, 150 word processors were also purchased to support the academic office automation function. Fourthly, three smaller time sharing networks were also established at some of the colleges. This all adds up to an increase of nearly 1,000 work stations for academic use during the past 18 months.

To support the academics, several innovative approaches were taken. A faculty literacy project was developed. In this project, every three months 50 faculty members receive an Apple IIe computer to take home. During the three month period, they are required to attend a weekly workshop which teaches them how to use the system. A heavy emphasis is made on the teaching of tools on the Apple. Such topics as spreadsheets, word processing, and authoring languages are heavily emphasized. At the conclusion of the three month period, another group of 50 faculty go through this program. The faculty who have gone through this program have highly endorsed this type of education. This program has created a great demand by these faculty members for increased

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computing in their department. The faculty who are selected for this program were selected from across all disciplines.

An important strategy has been to decentralize the computing from the District office to the colleges and at each college out into the departments. This has meant that efforts have been made to make sure that these systems can form sub-networks to the larger networks. The Apple computer has very effectively communicated to the Vax network. The word processors also communicate very easily to the larger network. The capital plans of the District have sufficient funds to continue this rapid expansion of microcomputers and time-sharing networks.

During the same period of time, complete changes took place in administrative computing also. During the past year, all new administrative systems have been implemented by Maricopa. All old systems, both software and hardware, were completely discarded. To accomplish this, Maricopa entered into a three-way agreement with DEC and Information Associates to use the Vax on the new Project Z software. Maricopa was the pilot site and has implemented all systems in Project Z. Substantial programming has been done by the Maricopa staff to supplement the administrative systems. On July 1, 1983, all systems including payroll/personnel systems, the accounting systems and the student registration systems were implemented. The payroll/personnel system prints approximately 7,000 payroll checks every two weeks and has flexible fringe benefit components. The accounting system handles all the financial transactions. All registration for the colleges was done on the new system during the summer for the fall semester. Most of the users of the registration system were using an on-line system for the first time. With this system, over 100,000 students were registered during this period of time. The new system is almost completely on-line and integrated to a large degree. The student information system was decentralized to each of the college computers. The identical programs are executed at all seven colleges although each college does registration differently. The payroll/personnel system and the accounting systems reside at the central computer in the District office. The exception is the financial transactions sent to it from the student billing and receivable system from each of the colleges. All systems are linked together by DECnet, and information from any of the systems can be routed quickly and easily from any of the colleges. All program maintenance is done out of a central office. Changes are downloaded through the network to the individual colleges.

The purpose of this paper is to describe the executive network that is used to supplement the previously mentioned systems. I would like to emphasize two themes during the rest of this paper. First, is what I call "the top-down" strategy and secondly is that office automation is more than a by-product.

During the procurement process in bidding for the new computer system, Maricopa was looking primarily for a new system that could support large numbers of student users and one that could implement all major administrative systems in an on-line mode. Mentioned in the bid specifications was office automation with some details associated with that system.

An evaluation matrix was established with a total of 1,000 points. This matrix had points for hardware, operating systems and application software. Included in the points for application software were 70 points for office automation systems. This represented 7% of the total points available. At that time, we were concerned with office automation but did not give it all the weight it deserved. In fact, DEC, the winning vendor, actually was rated low in office automation but had so many points in other areas that it still

won the evaluation process. What had happened was that DEC had neglected to sell some of their significant products that they had. We then became aware of products such as DECmate word processors and the Charlotte Office Automation System. These were some of the best kept secrets of DEC, but eventually we ended up with superior office automation products.

When we fully realized the potential of their products, we decided to implement a complete electronic mail system in addition to all of the other major administrative systems. At the same time, this Charlotte system of electronic mail and office automation moved from a regionally supported product within DEC to a corporately supported product called All-in-One Office System. Maricopa became the first major user of that system.

There were several reasons for us to become interested in electronic information systems. First, Maricopa Colleges are widely geographically dispersed within the Phoenix metropolitan area. Second, because we are an educational institution and continuously had people in meetings and classes, etc., telephone tag was a real problem among the staff of Maricopa. Only one of four calls were getting through. Third, the issue of computer literacy was becoming important and the strategy was to immerse people into computers as soon as possible. The first system that could be installed was the All-in-One system, and this would permit the executives to get their hands on terminals and work with the computer. It was hoped that hands-on experience would lead to a more computer literate group. Fourth, the All-in-One system could be delivered immediately, whereas, the other administrative systems were a year away from implementation.

The office automation system had moved from being only a by-product to being the first major system to be implemented, and its importance grew daily. Actually, the first people to use the system were the computer service department who all had terminals at their desks. They also were people more willing to tolerate some of the early problems in system implementation. Soon after they had successfully used the system for a couple of months, a deliberate strategy was undertaken to put the executive network in the office of the Chancellor, Vice-Chancellors and college presidents. This is what is meant by "the top down" approach. These executives never before had a terminal in their office. Thanks to the donation of color Gigi terminals from DEC for the purpose of placing them in executive offices, these people were the first to receive terminals. Thus, the first person outside of computer services to use the new computer was the Chancellor himself. The Chancellor immediately issued a policy statement toward the direction of paperless offices and that he would be willing to receive messages primarily in electronic form. He discouraged the use of paper memos. Training sessions were held and these executives began to use this network. As additional equipment began to arrive, the number of users began to spread down the organization. Now it is down to middle management users.

Because of the success of the network, executives were given systems for their homes along with their offices so that they could communicate and extend their workday from their homes. In addition, their secretaries were given a word processor that had terminal capability and access to the same network. The executives were all linked together on the network at work, at home, and with their secretaries. The types of equipment each had were a DEC Gigi terminal for their office, a DEC 350 Professional microcomputer for their home, and a DECmate word processor for their secretarial office.

Maricopa is governed by a locally elected five-member board of trustees. It was decided after the successful executive implementation that each of the

members of the Governing Board should also have access to the network from their homes and they became members of the network. They received a DEC Rainbow microcomputer.

An interesting development of the executive network is that a member of the executive network is the president of the faculty association. Maricopa has a strong faculty organization that is used in the bargaining for salaries and benefits. This group is part of the government structure of the colleges.

What are some of the uses these executives made from the network? The heaviest used part of the system was electronic mail messages. The way the system is organized is that they were able to send messages to individuals or to groups of employees through the system. Closely related to electronic mail was the electronic file cabinet. They were able to input into their file cabinet the messages they wanted to keep on a more permanent basis. These messages could be stored by subject, keyword and topic. Documents created on the DECmate word processors could be transferred into this system and filed. Another use of the system was the calendar management system.

Today only some of the executives keep their calendar electronically. If more did, the system provides for the automatic scheduling of meetings and tickler files for activities during the day.

Other uses of the system have been word processing, and the preparation of graphics. Several executives have used graphics to prepare slides for presentations. Through use of a graphics editor, these slides can be easily prepared. Many of the speeches our executives have given at national conferences have been accompanied by computer-produced slides from this system. (The slides that accompany this paper were done with this system.)

The largest potential use is to be able to access the administrative data files. Looking at the status of accounts, the preparation of the budget and checking enrollments are important to these executives. The additional tools of spreadsheets, personal filing systems, data based systems, etc. are just beginning to be used.

In her dissertation for Arizona State University, Jacquelyn Miller researched this network. As a result of her study, she reported 18 major findings and several conclusions.

1. The executive's keyboarding skills do not play a role in the level of use of the office information system or the length of messages.

2. Executives learn the equipment best during a hands-on training session, rather than through a demonstration on one computer or reading the manual.

3. Executives learn the functions of the system on a "need-to-know" basis. They prefer consulting with a resource person to group training.

4. Secretaries become anxious when they do not receive their own equipment for several months after training.

5. Secretaries are reluctant to attend training sessions in physically uncomfortable environments or for long durations of time (four to five hours).

6. Executives and secretaries become confused and feel overwhelmed when presented with an overabundance of information during the initial training stages.

7. Executives view the computer as a management tool. They become impatient if the response of the computer is not instantaneous. They resent reading messages that are frivolous or that are lengthy and technical.

8. Microcomputers in the home free the executives to work outside the office or without using the telephone to communicate with colleagues.

9. No systematic approach for the retention and destruction of documents in electronic or hard-copy form had been devised.

10. A noticeable reduction in the number of internal telephone calls and written messages resulted in the network.

11. The fact that secretaries no longer act as "gateways of information" for their bosses is not a matter of concern.

12. Secretaries are reluctant to read and file the executives' electronic messages.

13. Secretaries foresee their roles and responsibilities changing in the future. They prefer assignments involving a higher cognitive level of thinking.

14. An executive's average action is brief, lasting generally less than ten minutes. Seldom does the executive concentrate on only one task at a time.

15. The use of the network did not reduce the numbers of scheduled meetings among the executives.

16. The amount of information discussed at the meetings was greatly reduced, as was the length of the meetings.

17. Executives view the creation of an electronic network as a personal way in which to communciate and develop a feeling of cohesiveness among colleagues.

18. The key factor in guiding the organization through the transition period of manually processing information to electronically transmitting it is the chief executive officer's total commitment to using the office information system.

The method in which users are trained is a critical component in the implementation process of office information systems. Unless the user has immediate access to equipment and can learn the functions of the equipment simultaneously with the explanation of the system, training is of little value and leads only to increased confusion and self-doubt.

The acceptance of the computer as a management tool rather than a toy is another key factor in the executive's willingness to use the system.

The establishment of a network of users and the consistent use of the computer to transmit information will determine the success of total participation by all users.

The network allows the executive more discretionary time by reducing the amount of time spent in meetings, placing telephone calls, and relying on the mail system.

Educational institutions training office employees will need to emphasize keyboarding, organizational, and analytical skills.

The opportunity to accomplish work outside the office through the use of the microcomputer offers more flexibility and freedom to the executive's working style.

The reactions to having microcomputers available for home use ranged from a flat refusal to enthusiastic constant use. Three executives expressed the feelings that they worked enough hours at the office and resented the obligation of having to do more work at home. Two executives refuse to turn on the computer during the weekend unless they are leaving town. The remaining six executives did not feel that the presence of the computer necessarily extended their normal working day. (As they already put in the same number of hours without having the computer.) They found they prefer using the computer at home during periods of low use in order to get a quicker response rate from the system.

The major advantage to having the computer in the home, according to the executives, is the ability to accommodate each individual's particular working hours, thus encouraging creativity at any time, day or night. Seventy-three percent of the executives were enthusiastic about working at home on the computer, utilizing the word processing program to create speeches, reports, and articles for publication. They found the home a more relaxing, creative environment. Three executives expressed their surprise on getting an immediate reply from colleagues over the weekend or late in the evening. They do not expect to find others working on the system at the same odd hours as they are.

One user commented, "It's much more fun at home and I have more of a sense of accomplishment." More work is done with the computer than had been anticipated. Many administrators also produce documents and send them electronically to their secretaries, who will then begin working on them the next working day.

The executives were relieved to find that in case of illness work can still be done at home; and information can still be communicated through the electronic system. Much of the pressure of responsibility is lifted when such flexibility is available to them.

The executives reported that the quality and quantity of information received has not changed but that they are getting the information in a more timely manner. One executive stated, "The information coming across the screen is more credible and has more of an impact than if it were to be received in paper form." This executive dislikes receiving paper documents, which he considers bothersome and not as easy to handle as electronic communications.

A common assumption concerns the executive becoming too isolated from his/her staff as a result of spending a great amount of time using the computer. During the interview process, the researcher found this assumption to be

inaccurate from the executives' perspectives. One president commented, "I feel this system brings me closer to the others and makes me much more knowledgable about what is going on." All the presidents consider themselves highly accessible to the other administrators, staff, and faculty on their campuses. The majority of them, however, seemed to contradict that statement by admitting that their staff probably did not share those same feelings. One president remarked, "When I'm on campus, I'm available to any staff or faculty member; but I spend a great amount of my time away from the campus."

The presidents remarked on a greater feeling of cohesion amongst themselves as a result of the freer flow of communications that the network has allowed them. They reported that a great deal of time is saved by eliminating the process of transmitting information through the secretaries and the mail system to get information to their colleagues. The assurance that messages are reaching their colleagues has allowed them more opportunities to walk around the campuses to visit with faculty and staff.

The use of the telephone was viewed as a continuing method of communicating confidential information. All the executives reported that confidential information was not sent over the electronic mail system and was not written. Information of a sensitive nature was usually discussed away from the premises or via the executives' private telephone lines.

Each executive conveyed a sense of confidence that the information would be received instantly. Lack of frustration in repeated phone calls to relay information was evidenced during the observations.

In response to a question about any changes in decision-making patterns, all the executives stated that no major change had taken place in the way in which decisions were made. Accessibility of necessary information meant that decisions could be made more expeditiously.

Several administrators mentioned that a major advantage of the network system is the freer exchange of information and opinions among themselves, a positive step that had not been possible prior to the implementation of the network.

Some of the fears regarding electronic mail have not materialized. At first, there was fear that subordinates would not follow the normal chain of command and would issue electronic messages to higher ranking executives without going through their superior. That has not happened. Another fear that did not materialize was that there would be a flood of memos. It is true at first that users tend to be somewhat more frivolous with their messages just because of the experience of doing it for the first time and they are likely to send out "have a good weekend" type of messages. However, as they gained maturity, there has been a definite trend toward much more business-like messages.

Another significant factor has been that personal relations have not been reduced because of electronic communications. In fact, they may have been improved. What happened is that less time is spent in communications that can be answered quickly and more time can be spent in communications that require the indepth interpersonal communications. For example, a subordinate will come into an executive office with a quick question that needs a quick answer. To be courteous, some preliminary conversations need to take place. The final result is that it takes several minutes to answer the question by having the person come to the office. However, if the question had been sent electronically, the answer could have been given very quickly and effectively. It has been substantiated that the length of meetings and number of agenda items has been decreased by 50 percent because of the executive network.

Another important factor is that information does move much more rapidly throughout the organization. In the Maricopa situation, where paper would take at least a day or more by mail truck to arrive at another college, or telephone tag problems could take even longer, the electronic communication is received much more rapidly. A surprising development has been that the messages are perceived as less threatening. The receiver can deal with the message at his own pace and have time to reflect on the answer. When a question is asked face-to-face, a different response may be generated.

Another major use of the system has been the installation of the Legislative Information Management System (LIM). This system is an offshoot of the concept of "Issues Management". What is done is that all of the legislative bills that affect higher education in the state of Arizona are tracked and updated almost daily with the status of the bill, the sponsors, the way the votes apparently are going, the legislative leaders involved who should be contacted and finally a summary or position that the District is taking toward that bill. If a question should arise to a member of the District from an outside source as to what is the District's position, the bill can be interrogated on the screen and the official position given to the inquirer. This provides a much more consistent answer throughout the District. In addition, LIM can inform as to the progress of some of the bills and to which ones should be pushed along with political influence. This system was created by using the standard All-in-One filing system. No additional programming was needed to incorporate this system. Additional issues can be coded in such a fashion and maintained. It is the responsibility of the External Relations department to maintain this system.

Future uses of electronic mail systems are to connect it to the universities in the state of Arizona, particularly Arizona State University. There is a large need for Maricopa to communicate on an executive level to the universities. The technical incompatibility between DEC and IBM is the bottleneck but it is being addressed.

Currently, there are 160 users district-wide with the All-in-One system. These people have special accounts in order to use that system. Also, with the network, there is a VAX mail system for anyone who logs into the system, including students. Although this system can generate messages more quickly, it does not have all of the bells and whistles of the All-in-One system. All-in-One is restricted to key administrative users only.

To summarize the main themes of this paper, first, the executive network was incorporated in a "top-down" method. This is the best way of guaranteeing success. The payoffs are also greater. When you consider salary level of the top executives, any small percentage of improvement in their efficiency will help pay for their equipment in a fairly short period of time. Nothing adds credibility to a system as support from top management. Subordinates fall in line almost without question. There are very few reluctant users to the system. It is also hoped that the information that will be delivered to the executives in their offices will lead them to making the proper decisions that have major effects upon the institutions.

The other theme is that office automation is much more important than a by-product system. It has become a major system within Maricopa and a major value to the District. It is worth much more than the original 7 percent part of the system. In analysing the usages that are being made with the VAXs or microcomputers by faculty or by administrators, the office automation appli-

cation is the single major use of the system now. In surveys being done of business and industry, word processing emerges as the number one use on the micro-based systems.

Judith Leslie of Pima Community College, has published an interesting paper titled "Does Your President Keyboard?". In this paper, she suggests that the vitality and future of an institution depends on the answer to that question. At Maricopa our executives do keyboard and they are leading our colleges to relevance and excellence.