Vision Plan for the Automation in KFUPM

Computer-based communication and information sharing

Final Report of the Task Group

September, 2000

Contents

Abstract

Communication is an essential aspect of any group working towards a common goal. It is also a mean of information sharing. Computer based communication is now the major mechanism of communication. Different means of both synchronous and asynchronous communication is possible with the help of intranet/Internet. Information sharing and its use is another necessary requirement of today's information oriented world. In the age of Information Technology, the computer based communication and information sharing are becoming necessary for the proper functioning of organizations.

KFUPM being a leader in the region should be a role model of computer based communication and information sharing. Proper implementation and use of computer based communication and information sharing in both teaching and administrative activities will lead to increased efficiency and better use of available resources.

Introduction

Over the years different forms of computer based communications have evolved. Some are useful and others are not. Some are more effective than others. Computer-based communication can be classified as either synchronous or asynchronous. Traditionally, the asynchronous communication such as email, newsgroups, and mailing lists are in popular use. Advances in technology have made the computer based synchronous communication possible to varying degrees, which was traditionally available by other means like telephone. The aim of all modern communication mechanisms is to disseminate the information faster and more effectively than the old paper based communication. The benefit of any technology is bound with its proper use. The theme of this report is how to enhance efficiency and effectiveness of KFUPM administration, faculty, staff, and students through the use of computer-based communications and information sharing. This has two facets: one is to improve the use of existing computer-based technologies in use within the university and other is to introduce new beneficial technologies.

Existing state of affairs

The university is currently using two computer based communication mechanisms namely, email and newsgroups. The email is widely deployed and moderately used whereas the use of newsgroups still needs some orientation. Despite the long existence of email, most communication within departments and between different departments is done using papers. Using email would have been more efficient, effective, and a cheaper choice. It seems that many faculty, staff, and students are not comfortable in using email. Full deployment, proper training, and culture shift are needed to realize the full benefits of email. The following deficiencies can be pointed out in the current system:

- Easy access to email via an office personal computer is currently not available to all the staff and faculty.
- Some staff and faculty need some training on using email facility.
- Some percentages of those who are using email are not fully comfortable in using different features of email client.
- There should be some guidelines set on how to use the email system properly like putting proper subject lines, signature file or personal card, how to reply, which messages should be posted to newsgroups rather than email.
- There is no easy provision of finding someone's email address or a group alias.
- There is no proper training on how to use some advanced features of email clients like filtering.
- Newsgroups awareness is currently very limited.

The above mentioned points lead to a situation where one finds his mailbox full of mail everyday and only ten percent are relevant to him. This results in waste of time and inefficiency. Also, since the email is not fully deployed to all the corners of the university, it reduces one's confidence in using email as a primary communication mechanism.

The primary information sharing ways in the university using computers is either through folder sharing or web, but it is limited to sections of the university, which are more oriented towards computer use than others. Information sharing on the web or through other mechanism is still considered very difficult to achieve either because of technology unawareness or not being able to realize its importance and advantages. According to a rough estimate only 20% of faculty have their home pages and only 10% of them frequently update them. Only 2% of the faculty might be using their home pages for teaching. The following points seem to be contributing to the current situation:

- Lack of training about web technology and awareness about advantages and disadvantages.
- Lack of guidelines and standard in developing home pages.
- Lack of ease of publishing either over intranet or Internet.

The university website is lacking both in contents as well as in keeping up with the advances in technology. The university contribution over the World Wide Web is also minimal in terms of making its research or teaching contents available. Only 2-3% of the faculty has presence over the Internet.

Vision 2005

This vision aims to achieve state-of-art computer-based communication and information sharing throughout the university. The aim is two-folds: to improve the existing mechanisms of computer-based communication and information sharing as well as to introduce new mechanisms inline with current advances in technology. There are two sections: one discussing the computer-based communication and the other discussing the information sharing.

Computer-based Communication

There are two types of computer-based communication: synchronous and asynchronous. Examples of asynchronous communication are email, newsgroups, mailing lists, fax, archived audio/video streaming, etc. Examples of synchronous communication are chat/voice chat, video conferencing, online audio/video streaming, etc. Both forms of communication are useful under certain circumstances. Following is the vision for each type of communication:

Asynchronous Communication

Email

The email facility should be available to all the staff and faculty via their office personal computers. The students should be able to use this facility both in campus and dorms. Email clients and their customization should be standardized throughout the university.

In general, email service should be improved to provide:

- Convenient facility to find someone's email address or a group alias and its members. This is usually achieved by implementing directory services. It provides a convenient mechanism to store all kinds of information about a person. It also allows each person to change his information in directory services with authorization as it changes. Mail clients can usually be integrated with such directory services.
- Traditionally mail system worldwide does not guarantee that the mail is actually sent by someone who pretends to be. One approach to solve this problem is to PGP (Pretty Good Privacy) signature with all

_____

mails so the receiving end can verify the identity of sender. This may be necessary for certain sensitive official mails.

Awareness of minimal required functionality should be provided to staff, faculty and students via seminars and training sessions. The training can include the following:

- Reading and replying email (see guidelines below).
- Sending attachments.
- Developing ones personal card or signature file.
- Some minimal customization of email client in case of problems.
- Configuring message filters so that messages from certain sources or with certain subject lines, for example, are automatically stored in specific folders, etc.
- How to configure roles and their signature files to send mail with different roles, for example as a chairman, as an instructor, etc.

Guidelines should be set for communication via email. There can be different guidelines for official and unofficial mails within the university. Some common guidelines are:

- Including a suitable subject line.
- Including ones signature file or personal card at the end of every email.
- Mail of common interest but not urgent should be posted to newsgroups rather than sent via email.
- Habit of checking email periodically and replying back, if needed, as soon as possible.

Mailing Lists and Newsgroups

Email is useful for one to one or one to a small group, but it is not suitable for one to a large group not to say one to all. The results of the later is sometimes very painful where one person sends a mail to all and each of them replying to all. If one has nothing to do with the topic being discussed he needlessly has to spend time in sorting out his mail and deleting the ones not needed. The approach to solve this problem is to use mailing lists or newsgroups.

The mailing lists are created for certain kinds of interest groups like technology, web, geology, etc. The people interested in any of the mailing list register for that particular mailing list. The mail sent to any mailing list is distributed via email to all the registered participants as they have shown their willingness to receive such mail.

The newsgroups are oriented towards subjects of common interest but not at all times like seminars, announcements, etc. It can also be used where mailing lists are appropriate. It is a matter of choice. Whereas the mails sent to mailing lists are distributed to all interested participants mailboxes, the posting to newsgroups are kept on the newsgroup server and can be read at any time using news client. Online discussion forums have played a key role in community networks. Forums permit direct interaction among community members. They provide a place where different issues can be discussed and information can be shared quickly and easily.

Actually the full benefits of email are tied with its proper use and deciding whether the massage be sent through email, a mailing list or a newsgroup. Thus there is a great need of setting up some mailing lists and newsgroups and spreading their usefulness throughout the community.

Fax Services

Apart from other types of communication, certain information is still required to be sent in facsimile form. The usual way is to use a fax machine in university department or fax services department of the university. Also, the entire faculty receives faxes on the common departmental fax number, which is then distributed to faculty. The computer-based approach to this service is to setup a fax server and allow the faculty or staff to send faxes through it from their office machines. This requires scanners and setting up a fax server.

Archived Audio/Video Streaming

Audio/video streaming technologies can push the audio and video contents from a streaming server to desktops without overloading the network bandwidth. Being an educational institution, KFUPM can gain a lot by providing audio/video streaming for education and training. Audio video streaming can be either synchronous or asynchronous. When the audio/video is streamed from the archive then it is asynchronous. It can be used to provide recorded seminar presentations, classroom lectures, training sessions, and slides presentation via the computer to anyone's desktop. For example, the training sessions for email services can be recorded and served via audio/video streaming at any time.

It is well known that combining the textual information and audio/video can greatly enhance the educational and learning experience. Most of the tools for achieving this are either free or available at a reasonable cost. Tools are also user friendly. Faculty members can develop these multimedia presentations easily with these tools and put them on their website. These presentations can be used to enhance the

classroom discussions, present ongoing research, give introduction to new technologies, etc. The possibilities and benefits are tremendous.

Synchronous Communication

Chat/Voice Chat

It is a way to provide synchronous communication among people at different locations via a desktop client. It is a mean of providing interaction between people. Chat service (either text based or voice based) is useful if used with caution and above all it need not be just chatting, it can be as well be an informational talk between two or more people, for example, between a student and faculty or another student. With proper training and guidance the chatting infrastructure within the university can be used to an advantage. Training sessions can be conducted to guide its use towards productive activities.

Video Conferencing

It is not only a way to provide synchronous communication via desktop application but also an attempt to make the communication more realistic. Normally the communication is more effective when someone can see the person to whom he is talking. Video conferencing provides more realistic conversation than voice chat or telephonic conversation. University officials can take advantage of this facility to arrange meetings without leaving their offices. Most video conferencing tools also provide white board, chatting, document and application sharing tools. Proper planning is required to make it happen. Necessary hardware and software needs to be analyzed and networking infrastructure needs to be improved to provide the required bandwidth.

Online Audio/Video Streaming

This is a form of one way synchronous communication. Online audio/video streaming is useful for live presentations like conferences, visits, etc. There can be several live streams simultaneously and users can switch to the one of their interest. Again proper planning and necessary hardware and software are required to achieve this. When different university activities are available at a click the whole community becomes more dynamic and productive. Different conferences are held within the university throughout the year. There live coverage to the desktop can greatly enhance the educational and learning environment.

Information Sharing

World Wide Web

World Wide Web is now the standard media for publishing information over the Internet as well as intranet. As information dissemination is the primary goal of this university, taking advantage of the Web technology and making it available to both faculty and students is very important. It serves the dual purpose of both acquiring the information (information resources over the Internet) and publishing the information (university website and faculty/staff/students home pages).

The university has rightly made available the Web access to Internet to faculty, staff and students. Faculty and students can make use of it for both instructional and research purposes and in this regard there has been a tremendous enthusiasm shown. The main use of Web technology is limited to accessing the information resources over the Internet. The university website is not only lacking in complete and up-to-date contents, but also in utilizing the latest web technology for web applications, etc.

The Web is undoubtedly the main information sharing technology these days. Accessing this enormous information over the Internet is also becoming an art. Faculty and students should be aware of methods of tapping this huge information repository. Specially, students should be taught via seminars how to search for the required information without wasting too much time and how to make use of it.

The university website is mostly static with no dynamic contents. Even the static contents are not regularly updated and remain out-of-date. KFUPM needs to confirm its leadership in the region by improving its website and quickly adopting the new technologies. KFUPM share in terms of instructional and research contents over the World Wide Web still needs to be seen. The situation is very dim in this regard and portrays a bad image of the university. The outside world does not know what is being taught, what research is being carried out, what technologies are being used, to name a few, in KFUPM. This situation is very disappointing considering the KFUPM instructional and research superiority in the region. This is not being reflected by the university website. Also, there are only minimal number of web pages of faculty and student over the Internet. Even these pages have minimal information; there is only a little of teaching, projects, research, and technologies material which is normally not the case of good or average educational institutions. KFUPM website should also have an alumni section, so that, the university can keep in touch with them and they can communicate with each other.

The reason, it seems, for the above situation is the lack of expertise, lack of training, lack of recognizing the importance, lack of interest, and above all lack of allocating resources. There is a need of proper training and seminars for both students and faculty. There is a need of a professional Webmaster for the university

who is expert in his work. There is also a need of providing an easy way to publish ones home pages over the Internet.

The use of Web technology over the intranet is also not satisfactory. Making the information available through the Web is a great way of sharing it. This is true for all university activities, whether it is administration, teaching, learning, or research. The information is mostly useful as long as it is maintained. University administrative and academic departments hardly maintain this information actively. Also, most of the university activities can be automated via web applications. The lack of proper planning, lack of awareness of available technologies/products and resource reservation is the main reason for current situation. All university departments should have officially assigned and properly trained personal to make this happen. This is to realize that Web is no longer merely a way to share information, but also an access point for most of the applications that an organization needs.

Calendars and Scheduling

Time is organization's most valuable resource. One of the activities that waste time and effort is scheduling meetings. Meetings are normally scheduled after dealing with lots of faxes or telephonic conversation, and sometimes emails. Therefore, resulting in tremendous waste of time and effort.

Calendaring and scheduling are two different functions. Calendaring is an ongoing system of keeping track of dates, times and appointments or events. Scheduling is the actual process of agreeing to participate in an event or marking off time on one's calendar. Even though they are different functions they are very closely related.

This is one of the aspects of automation that can alone bring the efficiency and cooperation within the activities of the university. The concept is simple, if the busy schedules of all the university personnel are available online, then the activities (meetings, exams, etc.) can be scheduled not only easily but also automatically. This will save tremendous amount of time that is normally spent in scheduling meetings, for example. The same concept can also be used to automatically schedule the university resources; for example, auditoriums, halls, projectors, etc. The reservations for these items can be maintained online so that new reservations can be requested in their free times.

As the browser is ubiquitous, one of the ways to automate the process of scheduling meetings is to use a Web-based scheduling. Some of the criteria for a ubiquitous Web-based scheduling system are:

- it must use e-mail as the message transport as that is what is most commonly used today
- it must provide multiple levels of security and viewer access

- it must aid in the coordination of meetings without being intrusive
- it must support universal accessibility.

Directory Services

Directory service is a database of information about users (name, password, phone, address, etc.), applications and equipment on the network. In simple terms, a directory service is the interface between the applications and equipment that reside on a network and the humans who use the network: who is allowed, who is allowed to use some software, etc. A directory service provides a way to manage the storage and distribution of shared information. Such information can range from the email addresses and phone numbers of an organization's employees, to the IP addresses and print capabilities of a department's printers, to the configuration information for a suite of application servers. A directory service is essential to the implementation of distributed applications. The following advantages can be gained by establishing directory services in KFUPM:

- Common authentication and authorization database for users
- A way to store public information (name, phone, address, etc.) about all the people in the university
- A way to provide update feature to a person himself when some of his information needs to be changed or updated
- A way to find someone's information
- A way to integrate all applications like email, calendaring & scheduling, etc.
- Setting the right direction for KFUPM computer network and applications. This is in line with the observation that as applications become more distributed, the efficient management and distribution of the information upon which they depend becomes more and more of a problem.

Portal Servers

More and more users are looking for a single window to their most commonly used desktop information, as opposed to a handy collection of Web site links, eventually leading to static and dynamic contents. The whole point of a portal is for it to access information from different places and pull it into one interface.

Students/staff should only have to manage one password/entry point. All relevant/timely data should be synchronized and displayed on a single screen if possible. Students/staff can login from anywhere and immediately know what they need to do that day, some idea of progress done so far, avoid cluttering with possibilities and show only directly relevant links for the work to be done.

Portal software is used to create personalized information sources and communities of interest within a campus or university World Wide Web site. Campus portals automatically customize "channels" of information for individual students and employees at the moment they log in to the campus network. The most useful channels are highly customized to fit the roles and interests of each student or employee – by bringing together "bits of applications and little bits of data".

Three options are available to deploy this technology: the university can either buy the commercial portal software (which may not satisfy the university requirements); or the university can develop the portal software itself (which will require planning, resources and expertise); or join the programming group (e.g., www.js-sig.com, that is developing the free portal software JA-SIG Portal; this will usually require dedicating an expert programmer to take part in the programming efforts of the group – this is usually the best way to take advantage of open source software). According to the JA-SIG portal white paper the following are the advantages (or requirements) of establishing a portal service:

- provide access to all information and services through a single graphical interface;
- support a single log-on to obtain authentication and authorization to all information resources and applications;
- provide a framework where all elements of the university (academic, administrative and community) and all business applications can be integrated;
- provide a convenient set of communications services which are web-based
- provide a one-stop place where all members of the university community can perform all business transactions
- provide the ability to present information and access to services on an individual basis in personalized manner.
- provide each member of the community with the ability to customize the appearance, layout and information on an individual basis;
- grant to the university full control and self-management of appearance and content;
- be vendor independent (not locked into proprietary hardware and/or software);
- be free of commercialization (no advertising or the sale of products unless university sponsored);
- be flexible and be able to absorb new technology advances and new applications;
- be available to all constituents 24 hours a day, 7 days a week.

Implementing the Vision

The following points can greatly help in implementing the vision of computer-based communication and information sharing:

- Administration commitment in terms of planning and resources
- Realizing the deficiencies of current status and their consequences
- Improving the currently used services in the suggested manner, for example, email, newsgroups, web, etc.
- Starting the proposed email, Web, and Scheduling initiatives on a high priority basis
- Setting the guidelines and policies to use the services
- Arranging seminars and training sessions to educate the people
- Plan for further studying and introducing the suggested new services
- Acquire the expertise or train existing people to establish and maintain the suggested services successfully
- Establishing a body in the university to study evolving new technologies to keep up with the fast changing Information Technology world
- Careful study is required to select the right software and hardware product
- The following high priority initiatives are suggested:

Initiative 1

It should be made mandatory that all KFUPM administrative and departmental communication (e.g., calling for meetings, minutes, regular requests) should be made through email and newsgroups should be used when appropriate.

Initiative 2

The university website should have an official home page for each faculty with some minimum information extracted automatically from a database which is kept updated and a link should be provided to faculty personal home page. Every faculty shall develop a personal home page with some minimum information: Faculty evaluation shall be updated to include evaluation of observing the minimum requirements of faculty web page.

Initiative 3:

A server should be setup for university wide scheduling and calendaring and it should be made mandatory to keep ones busy schedule on the server so that the meetings can be scheduled automatically.

Initiative 4

A plan should be made for training sessions and seminars to educate and train people in support of the above initiatives.

Anticipated Difficulties

The following difficulties can be anticipated:

- The people resisting
    - to change the way they communicate,
    - to change the way they share information,
    - to follow the guidelines for communication and information sharing
    - to adopt new tools
- The lack of expertise to implement and maintain these services
- The lack of communication infrastructure for some of these services
- Overwhelming options for software and hardware products can lead to the selection of wrong ones, if not carefully done.

Conclusions

Computer-based communication can be used effectively to increase the productivity and efficiency of faculty, staff and students. Information sharing specially via web is now the standard mechanism in most of the universities to publish the public research and teaching material as well as projecting the university's image worldwide and providing a unified access point to the university. There is a pressing need to realize that we will be lagging behind other universities if urgent measures are not taken immediately.