Unified Communications Challenges

The advent of unified communications will pose a number of significant challenges in a landscape whose terrain is largely uncertain. Extensive planning will be essential for providing a highly functional service while avoiding major chasms. An overview of some of the key issues may provide a useful introduction to the problem.

What is unified communications?
One definition of unified communications is the assimilation of instant messaging, electronic mail, telephony, voice mail, paging, video conferencing, facsimile services, et al., into a single application. Others cast the net wider to include integration with groupware and contact center applications. All elements must share a common address book, directory paradigm, and message management facility. The unified communications application must be available from the desktop as well as from all capable portable wireless devices with office, campus, national, and international coverage. Notification, call forwarding, and message access would be available to all points of access under the control of user-established rules and filters, with appropriate transformations and media adaptation for each kind of access device. Although complete convergence of data, voice, and video networking is not a pre-requisite for at least some level of unified messaging, it will become a major driver for deploying unified messaging. In a converged world, users will start demanding compatibility and integration -- they will not accept similar, but incompatible applications on their desktops. Having to manage 3 or 4 different address books will make the lack of integration very obvious.

The desktop will be a privileged device for unified communications for many people. Those that are office-based will want to benefit from the superior audio-visual capabilities (large monitors, stereo speakers, etc.) of desktops (as compared to hard-wired telephones, for example) and use them as their primary communications devices. The desktop will be able to handle all kinds of messaging, and will be the logical place from which to manage address books, initiate calls, review messages, etc. Accessories such as headsets or even traditional cradle devices could be attached to the desktop to provide convenience or a legacy "experience", but it will be the desktop that is connected to the network. Other devices such as legacy telephones, cell phones, PDAs, and whatever new choices evolve out of the fusion of features of today's devices, will be additional devices for accessing unified messaging. Each of them will provide a "natural" interface for certain kinds of messaging, but require presentation adaptation and/or media conversion for others.

Issues
Unified addressing is the most evident issue. Typically, e-mail addresses are assigned by the institution (although delivery may be elsewhere), instant messaging ids are selected by the user and supported by the service provider, telephony uses internationally managed telephone numbers, and video conferencing uses IP addresses. There are obvious problems with all of them. For example, IP addresses are not portable for a laptop that moves from one network to another. Telephone numbers are not very natural for use as e-mail addresses. It may be difficult to enter a userid on a cell phone. One
approach is to locate multiple, media-dependent addresses within a single directory, rather than use a common, universal address. Even the directory approach has significant issues as to address assignment, authentication, portability, and cross-medium address mapping.

From the user point of view, an integrated address book is a must. On a desktop, one would want to locate a user, and then click on the appropriate field to initiate whatever kind of messaging session is desired. Hopefully, the same address book would be accessible from any device one is currently using, although modified as appropriate for the form factor. One architectural decision is whether to maintain the address book on a primary desktop and then to export and/or synchronize it with copies on other devices, or to maintain one centrally with different interfaces for different devices, so that it can be accessed from anywhere.

Mobility is a multi-faceted issue. Messaging applications should be available from the desktop, from a home computer, from a laptop computer that may be connected via wireless or at another location, from cell phones, from PDAs, and from whatever new wireless devices may emerge. Authentication, security, and call forwarding are thorny problems. Unlike traditional telephony, messages should go to the user, wherever he or she may be, rather than to a specific physical device. To avoid being overwhelmed by incoming messages anytime/anyplace, software filtering will be a must. I.e., users must be able to specify what kinds of calls they will accept or want to be notified of (i.e. should be forwarded to whatever device they are currently carrying or working on), and from whom. The rules must take into account time of day, day of the week, vacations, originating medium, etc. Bluetooth and/or GPS-based technology is likely to be extremely useful for determining where a user is physically, and for activating appropriate rules.

Which devices users have, and who provides them represent other key issues. If we believe that within a few years virtually everyone will have some sort of combined cell phone/PDA, and use their desktops as primary communication devices in the office, then is there any need to provide desktop telephones (IP-based as well as traditional)? Should institutions provide the cell phone/PDAs? There are financial, management, ethical, and technology arguments that will make this choice complex. People are not going to want to carry two sets of portable devices, so issues around the integration of business and personal messaging, as well as addressing, are going to have to be resolved. If institutions are providing tens of thousands of cell phone/PDAs, should they become their own cell providers? What kinds of wireless technology and gateways will be provided and by whom?

Beyond the use of unified communications for people-to-people interactions, there are a number of applications that embed or rely upon messaging. These include workflow, web pages that allow the launching of messaging, and help desk applications. Unified communications applications will need to recognize these applications and do the appropriate thing. Authorization interfaces will potentially be needed in addition to authentication for these applications. Ownership issues of messaging devices as well as control of the messaging stores are likely to be significant for these applications. Note that control of the message stores (i.e., where e-mail and voice mail messages are stored) is also important in any case where internal, sensitive, and confidential information may be present in messages; i.e. for virtually all faculty and staff.
What drivers will condition deployment?
Key drivers impacting deployment on campuses include product availability, interest in or aversion to deploying leading-edge technology, constituent pressure and the occurrence of key financial/technology decision points, such as the expiration of a lease or the need to upgrade a telephone switch. The first three of these drivers interact very strongly. Although no single product or product suite currently exists that provides a complete unified messaging service, various pieces are available. These solutions generally work only for a restricted amount of functionality and on a small number of platforms. Generally, the higher the functionality, the more restrictive the supported environment is. So depending on which PBXs, voicemail systems, voice response systems, e-mail systems, directories, wireless infrastructure, etc., are in production at a given campus, opportunities to deploy early unified messaging products will vary. From that point, experimentation will be driven by the comfort level of the technology organization and the pressure from the university community. Administrative staff are probably the group with the most urgent needs, but some faculty, especially clinical faculty, would also be highly interested. As everyone becomes increasingly mobile and the number and types of portable devices proliferate, pressure for unified message functionality will mount, and the increasing availability of applications will have a similar effect.
In the near term, key decision points will occur whenever there is a need to replace or upgrade some very expensive piece of the telecommunication infrastructure. These are both opportunities to set the stage for deploying unified message, and potential traps for restricting one's options in the future. An institutional unified messaging strategy needs to be elaborated, and needs to serve as one of the key criteria against which decisions are made.

Conclusion
Unified messaging will pose a set of thorny policy, financial, management, and technology issues. Institutions must prepare for managing all of the technologies and issues as an integrated whole, and beware of solving problems with a piecemeal approach. Key policies and strategies should be developed and instituted early on. Institutions need to determine which pieces they need to take control of and which pieces can be left to individuals. Failure to do so is likely to lead to poor and/or delayed implementation of functionality, higher than necessary expenditures, potential exposure to lawsuits, and having to answer to forceful criticism from campus constituencies.