Strategic Plan for Technology

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1.0 Executive Summary

Process Overview

In September of 1998, The Information Technology Resource Committee at Radford University began the task of developing a University wide strategic plan for Information Technology (IT) that would:

- serve as a bridge between the University's Strategic Plan and annual operating decisions made for the acquisition, deployment, use, and support of information technology at the University;
- set strategic directions for the use and support of information technology;
- provide standards, guidelines, and procedures needed to effectively use information technology at Radford,

An initial environmental scan was conducted by an I.T. executive committee to identify threats and opportunities related to technology that Radford University needed to respond to. An open meeting of University faculty and staff was then held to discuss these findings, identify those that were most important, and identify threats and opportunities perceived by the faculty and staff that had not been identified by the executive committee.

Fourteen areas were identified where technology applications, infrastructure, policies, training, and support needed to be addressed. Workgroups consisting of technical experts as well as end-users were formed for each area. The workgroups were provided with planning outlines, and other needed resources. Individual plan sections were created through a two draft process which included an opportunity for comment by the entire University Community.

The I.T. executive committee was responsible for the review and final editing of the plan sections in order to address any inconsistencies, feasibility issues, and in order to develop two resulting plan sections on budgeting and personnel which would be based on the recommendations of the preceding sections.

The plan was then reviewed by the full ITR Committee on October 1, 1999, and sent forward to the University Administration for final approval as the basis for annual goals for technology at Radford University, with annual review and progress reports by the ITR organization and the ITR Committee.

Content Overview

Each plan section adheres to the same structure. First, the current environment for that area is described. Second, a list of critical issues is identified for that area. Identifying and addressing only critical issues helps reduce the scope of the strategic plan and improve its focus. Finally, objectives and related action plans that should be implemented are presented in order to address each critical issue.
**Student, Faculty, and Staff Competencies:**
At the beginning of the plan are recommended minimum competencies that should be developed in all students, faculty, and staff. Without these competencies no amount of resources invested in systems or infrastructure can lead to the accomplishment of the University's goals. A related recommendation is also made to investigate the possibility of external validation of student competencies through an optional "certificate" program.

**Applications of Technology:**
Sections 3.2 through 3.6 of the plan addresses the use of technology for instruction, administrative functions, communications, research, and public relations. In the area of instructional technology recommendations for the use of multi-media classroom and computer labs are made, as are recommendations for "web-enhanced" and "web-delivered" courses. The subsection on administrative and ancillary systems sets directions for system improvements and replacements, the increased use of electronic transactions, and movement toward reduced paper handling and storage. Recommendations in the area of communication applications include new directions for email systems, scheduling software, web use, system logons, and file storage. The plan section on research applications addresses needs and standards for statistical and other quantitative software as well as research databases. Finally, subsection 3.6 addresses the application of the Web to public relations.

**Infrastructure for Technology:**
The uses of technology addressed in Sections 3.1 through 3.6 cannot be realized without parallel consideration of the infrastructure necessary to effectively and efficiently run those applications. Sections 4.1 through 4.5 address Radford's technology infrastructures including items such as the campus network, Internet connection, computer labs, electronic classrooms and telecommunications systems. In addition to these obvious technology infrastructures this plan section also examines the role of student owned computers in Radford’s technology infrastructure; the need for electrical, air conditioning, and other building infrastructures to successfully deploy technology; and the many technologies available through the McConnell Library.

**Technology Acquisition Guidelines:**
Radford's strategic plan for information technology will require a significant investment of resources. The Technology acquisition guidelines addressed in Section 5.0 of the plan will ensure that these investments are made in an efficient and coordinated manner by setting forth goals and procedures for establishing software and hardware standards. While the academic environment of Radford University is too rich to completely standardize on all hardware and software, standardization to the extent possible will greatly reduce training and support costs.

**Technical Training and Support**
Faculty and staff consistently identified training and support as one of the most critical areas. Plan sections 6.0 and 7.0 address these issues. Section 6.0, the “Faculty and Staff Development Plan,” examines the need for more coordinated technology training on campus and also the need to integrate technology training into the job responsibilities, development
plans, and evaluations of employees. Section 7.0, the “Technology Support Plan,” addresses the need for improved communications of technology problems and solutions, a well-defined and more integrated support structure, and improved policies and procedures for the deployment of large volumes of computer hardware and software.

**Personnel and Budgeting Issues**

Sections 8.0 and 9.0 of the technology plan were developed to consolidate and coordinate the budget and personnel implications and recommendations of all other plan sections.

The Personnel and Organization Plan presented in Section 8.0 makes recommendations in six areas: 1) the structure of academic computing and the role and interrelationships of central and decentralized technology support staff, 2) distance education, 3) technical support staffing, 4) Web specialists, 5) roles and interrelationships within various broadcast media areas, and 6) network and information security staffing.

The Funding Plan presented in Section 9.0 addresses the need to coordinate the many different funding sources used to purchase and support technology as well as the need to identify additional permanent funding sources for technology investments. Recommendations are also provided in this section to improve the efficiency with which current funds by ensuring that software, training, deployment, replacement, and support costs are considered in all funding decisions and that sharing of resources across departments and colleges is fully explored.

**Implementation and Assessment:**

Final drafts of each of the plan sections provided recommended actions for the University. The IT executive committee compiled these action plans into an implementation document, designating if unspecified, a responsible office and a time line for each action. This worksheet style document has been sorted by responsible office for dissemination to those offices.

Offices are responsible for implementing the plan actions and reporting back to the ITR Committee on their progress. The ITR committee is responsible for summarizing these progress reports into an overall plan progress report for the University Administration as well as the University community at large.
2.0 Environmental Scan

To provide a foundation for developing this strategic plan, an environmental scan was conducted to identify the major planning assumptions needed. The following were identified and used in the development of Radford's Strategic Plan for Technology.

Planning Assumptions related to Students, Service Community, and Alumni

• Most students entering RU already have many basic computer skills; however, there are still many entering students with few such skills.

• Public schools in Virginia and other states are placing greater emphases on developing more advanced computer skills for students at all grade levels.

• Over half of our entering students indicated that they planned to bring a computer with them.

• Based on a survey of entering students, there is strong interest among most students in further developing their computer skills.

• Entering students report that they have developed their current level of skills through a variety of means; the most common were “trial and error” self instruction, learning from friends, and learning through courses.

• Among the major expectations of our students regarding technology are
  - 24 hour computer availability and accessibility in residence halls and academic buildings
  - availability of state of the art hardware and access to the Internet
  - ability to communicate with professors and advisors on-line
  - opportunities for training and availability of assistance
  - connectivity to the library and the ability to use computers as a research tool

• There is a great need and opportunity to provide workforce training in technology skills within our service community.

• Technology provides mechanisms to deliver instruction and services to our service community.

• Technology, particularly through the web, provides opportunities for maintaining connections and providing services to alumni.
Planning Assumptions related to Employers

- The demand for employees in technology fields is one of the biggest growth areas of the state and national economy. Virginia currently has over 25,000 job vacancies in the technology industry alone.

- Employers in all fields – not just technology jobs – consider computer skills among the most important qualifications for all types of jobs. In a 1997 survey of all employers recruiting on a college campus, over 83% considered computer skills important in their hiring decisions.

- As the rate of technology change is accelerating, it is becoming increasingly important for educational programs to keep informed of the skills most expected by potential employers of our students.

- There are increasing opportunities for partnerships with employers to provide continuing training in the workforce.

Planning Assumptions related to Economic, Political, and Social Factors

- Legislative funding, particularly in the form of Equipment Trust Funds for technology and special initiatives, is currently a major source of our dollars for technology improvements. Most of this special funding is typically limited to hardware and cannot typically be used for other costs such as software or personnel support.

- Enrollments greatly affect the availability of funds for technology; enrollment based funds from tuition and fees can be used for other expenditures beyond hardware.

- Grants and contracts, including partnerships with business and industry, are used by many institutions to supplement funds for technology enhancements.

- Expanded technology education and the expanded use of technology to provide more efficient instruction is a major emphasis among state expectations for Virginia public institutions.

- State mandates for greater efficiencies in the higher education budgets of Virginia institutions can be expected to increase.

- Virginia has emerged as a leading state in technology based economic development and technology oriented jobs.
Planning Assumptions related to Other Institutions

• Technology supported distance education and on-line instructional offerings are key elements in the strategic plans of almost all of our primary competitive institutions.

• Competitive institutions are moving towards greater use of electronic classrooms and technology based instruction.

• The distance education offerings of other institutions are making the traditional geographical domains of regional institutions obsolete.

• “Technology-laden distance education is neither simple nor inexpensive. It is best viewed as a business, one that involves real and recurring costs ... as well as a significant technological infrastructure.” Kenneth Green

• “The technologies coming to market over the next decade are more likely to enhance what faculty already do rather than fundamentally change faculty behaviors and practices.” Kenneth Green

• According to the 1998 Campus Computing Project survey, over 40% of college classes use email in some way, one-third of college classes include some form of Internet use, and over one-fifth of college classes use the web for course materials and resources.

• Most of our competitive institutions currently do not require all students to purchase computers; some but not all require student purchase of computers for majors in technology programs; many provide information on recommended configurations for students who want to buy a computer.

• Cooperation and resource sharing in technology among Virginia institutions has typically been lacking except in the area of library resources.

• The Virginia Independent Colleges have begun a program designed to certify computer competencies of their liberal arts graduates.

• Many of our competitor’s web sites are becoming more sophisticated and more diverse than what ours currently provides.

• Some other institutions are accepting secure credit card transactions over the web for tuition and other charges.

• There is a growing number of corporate-institutional partnerships, corporate training centers, and institutional consortiums that we are competing against in some areas, especially technology training and distance education.
• Increasingly, we are competing with community colleges for students in their first two years, and these colleges appear to react more quickly to change and offer more technology training than does RU.

• Some institutions are extending their instructional outreach to the K-12 public schools.

• RU’s current practice of acting as an ISP for its students on campus and through the modem pool gives us a competitive advantage in recruiting students.

Planning Assumptions related to Technology

• Computer technology, including basic system components, operating systems, peripherals, software, and networking, continues to change at such a rapid rate that it is difficult to predict what will be the standards beyond a couple years.

• Increases in the speed of computer communications continue to provide for new, higher quality capabilities.

• Technology developments include the increasing integration of communications media, including television and telephone, with computers.

• Web applications and their use are expanding at particularly rapid rates and are becoming a major information medium in all aspects of society.
3.1 Student Competencies

Current Environment

3.1.1 General Competencies
The General Education Program expresses the following among its general goals: “Upon completion of the General Education Program, students should be able to…use appropriate computer technologies to gather and organize information, to solve problems, and to communicate ideas.” The University has not, however, established specific computer competencies and information literacy skills that all graduates should have, nor has the University established a process by which academic departments can develop additional levels of knowledge, skills, and abilities that their majors should acquire.

3.1.2 Discipline Specific Competencies
Some academic departments have established computer knowledge, skills, and abilities that graduates of their programs must have. These departmental competencies are not currently integrated with a core set of university-wide competencies. The establishment of a set of university-wide competencies will require reconsideration and revision of some discipline specific competencies.

Critical Issues

1. Should RU develop a set of basic computer and information literacy competencies that all students must acquire prior to graduation?

2. Should RU develop a process by which academic departments develop and specify additional levels of computer and information literacy competencies that graduates in their majors must acquire prior to graduation?

3. Should RU undergo a study of the extent to which courses in the General Education Program actually do address the goal that “students should be able to…use appropriate computer technologies to gather and organize information, to solve problems, and to communicate ideas?”

4. Should RU develop an assessment program that will provide information about the extent to which all students are acquiring a set of basic computer and information literacy competencies prior to graduation?

5. Should RU develop an optional “certificate” program that will allow students to demonstrate computer and information literacy competencies prior to graduation, gain certification, and have that certification noted on their transcripts?
Strategic Goals and Action Plans

1. RU should develop a set of basic computer and information literacy competencies that all students should acquire prior to graduation.
   a. Included in this document (p. 12-18) is a “draft” set of basic computer and information literacy competencies that all students should acquire prior to graduation.
   b. This “draft” set of basic computer and information literacy competencies that all students should acquire prior to graduation should be subjected to review by all academic departments to elicit feedback that can result in revisions and eventual adoption by November 1, 1999.
   c. The adopted set of basic computer and information literacy competencies that all students should acquire prior to graduation should be published in the 2000-2001 Radford University Undergraduate Catalog.
   d. This process should be guided by the Information Technology Resources Committee.

2. RU should develop a process by which academic departments develop and specify additional levels of computer and information literacy competencies that graduates in their majors should acquire prior to graduation.
   a. All academic departments should indicate by the end of the fall 1999 term whether students completing their majors must have computer and information literacy competencies beyond those specified for all students.
   b. For those departments indicating that graduates of their majors must have computer and information literacy competencies beyond those specified for all students, the additional computer and information literacy competencies for those majors must be delineated by those departments by the end of the fall 1999 term and published in the 2000-2001 Radford University Undergraduate Catalog.
   c. The dean of each college will coordinate this process.

3. RU should undergo a study of the extent to which courses in the General Education Program actually do address the goal that “students should be able to...use appropriate computer technologies to gather and organize information, to solve problems, and to communicate ideas.”
   a. By the end of the 2000-2001 academic year, the General Education Curriculum Advisory Committee and the General Education Assessment Committee should use established procedures to ensure that courses included in the General Education Program systematically provide students with instruction, practice, and experiences that enable them to acquire the computer and information literacy competencies that are established for all students.
   b. By the end of the 2000-2001 academic year, the General Education Curriculum Advisory Committee should collaborate with Academic Computing Services to determine the extent to which co-curricular learning opportunities – including self-paced computer-based multimedia instructional programs and non-credit workshops – can complement and supplement instruction and learning opportunities in the General Education Program.
4. Radford University should develop an assessment program that will provide information about the extent to which all students are acquiring a set of basic computer and information literacy competencies prior to graduation.
   a. The Office of Institutional Research, Planning, and Assessment should continue to administer the Radford University Computer Literacy Questionnaire, first administered to entering students during QUEST 1998, as a way of gathering baseline data on the perceived levels of computer and information literacy competencies entering students bring with them to Radford University.
   b. The Office of Institutional Research, Planning, and Assessment should review the “draft” set of basic computer and information literacy competencies and make revisions to the Radford University Computer Literacy Questionnaire to more closely align the questions in that instrument with the computer and information literacy competencies that Radford University will expect all graduate to acquire.
   c. The Office of Institutional Research, Planning, and Assessment should develop assessment instruments that will provide information about students’ acquisition of computer and information literacy competencies in order to determine when, how, and to what extent students are acquiring the general competencies that have been established for all students and the advanced competencies that have been established by departments.
   d. Academic departments and the General Education Curriculum Advisory Committee should use the assessment information to effect curriculum revisions to improve acquisition of computer and information literacy competencies.
   e. Academic Computing Services, Residential Life, New Student Programs, the University Library and other relevant curricular and co-curricular programs that can contribute to the acquisition of computer and information literacy competencies should use the assessment information to effect changes to improve acquisition of computer and information literacy competencies.
   f. As part of its ongoing assessment of computer and information literacy competencies, the University should consult with students’ prospective employers to determine their expectations in these areas and to match continually RU’s competencies with what graduates will need to enter professions and career paths.
   g. The University should use assessment data to revise and update course content, instruction, and its established student computer and information literacy competencies as technology advances, as students enter RU with changing levels of computer and information literacy competencies, and as academic and professional expectations in this area change.

5. Radford University should explore developing an optional “certificate” program that will allow students to demonstrate computer and information literacy competencies prior to graduation, gain certification, and have that certification noted on their transcripts.
   a. To make graduates more employable, RU should explore developing a computer and information literacy certificate program that students can elect to complete.
   b. This program could be modeled on the program that has been initiated by the Virginia Foundation for Independent Colleges.
c. An interdisciplinary faculty committee should be created during the 1999-2000 academic year to explore the development of a certificate option that might be available to students graduating as early as the 2000-2001 academic year.

d. The Information Technology Resources Committee is responsible for developing and implementing this area.
Student Computer Competencies

All undergraduate students will acquire the following computer competencies prior to graduation.

1. General Computer Knowledge

1.1 Students will be able to troubleshoot simple problems and will be able to effectively read and utilize and manual in order to do so.

Students will be able to troubleshoot simple problems such as disk errors, hardware hookup errors, and printer problems. They will also understand how to troubleshoot common printer problems such as toner, ink cartridge, and print quality errors. Students should be able to read and utilize effectively a manual in order to troubleshoot and solve basic hardware, software, or printer problems.

1.2 Students will understand how to make appropriate internet, Ethernet, and modem connections

Students will be able to understand and make the appropriate connections to network resources, whether using an Ethernet connection or modem connection.

1.3 Students will be able to set up a computer and make appropriate connections

Students will be able to fully assemble a new computer including setting up hardware, making all appropriate connections, troubleshooting errors, and installing all appropriate commonly used productivity software.

1.4 Students will have basic understand of operating systems, memory, and other components

Students will have enough of an understanding of operating systems, memory, etc., in order to assist with the basic troubleshooting process. Students should have a conceptual understanding of how computers operate in order to further their understanding of how to fix common problems.

2. General computer management skills

2.1 Students will demonstrate a basic understanding of computer security issues – passwords, viruses, Internet security, etc.

Students will be able to understand and assess risks associated with transferring files among computers and transferring files via networks. They will know how to take reasonable measures to protect their computers from viruses, and they will have the ability to use passwords to protect systems and documents from unauthorized access.

2.2 Students will understand the use of basic utility software.

Students will understand that utility software, such as Norton, can be employed to remedy storage and other malfunctions with computers. They will understand that they can seek assistance from computer experts to use such software to remedy problems that may be beyond their own abilities to solve.

2.3 Students will understand how to maneuver the desktop effectively, including using multi-tasking abilities, creating shortcuts, and using task bars.
Students will be able to work effectively with multiple computer programs simultaneously, moving data and information among e-mail applications, network browsers, word processors, data bases, spreadsheets, and presentation programs.

2.4 Students will be able to manage data files.

Students will be able to use the operating system to perform a variety of tasks related to file storage and management including organizing folders or directories, creating backups of all folders and directories, moving files from one storage device to another, and transferring files (on disk and via networks) to others with whom they must share information.

3. **Word Processing Competencies**
3.1 Students will be able to use online Help features.
3.2 Students will be able to use spell checking.
3.3 Students will be able to use thesaurus.
3.4 Students will be able to copy/cut paste.
3.5 Students will be able to create tables.
3.6 Students will be able to format documents: change font style, font size, color; change margins; change line spacing.
3.7 Students will be able to use desktop publishing features: incorporate graphics (images, charts, graphs); manipulate text boxes; insert lines; insert shapes.
3.8 Students will be able to use built-in templates.
3.9 Students will be able to import files.
3.10 Students will be able to print documents.

4. **Spreadsheet Competencies**
4.1 Students will be able to use online Help feature.
4.2 Students will be able to set up a spreadsheet to solve a problem.
4.3 Students will be able to enter data.
4.4 Students will be able to enter text.
4.5 Students will be able to format values (percentages, currency, dates, etc.) and text (font style, font size, font color, lines, borders).
4.6 Students will be able to insert and delete columns and rows.
4.7 Students will be able to copy/cut paste.
4.8 Students will be able to perform calculations.
4.9 Students will be able to extract information.
4.10 Students will be able to generate graphical representations of data.
4.11 Students will be able to print spreadsheets.

5. **Database Competencies**
5.1 Students will be able to use online Help feature.
5.2 Students will be able to design databases.
5.3 Students will be able to enter and maintain data.
5.4 Students will be able to sort data.
5.5 Students will be able to query data.
5.6 Students will be able to create forms.
5.7 Students will be able to generate reports.
5.8 Students will be able to print tables, forms, and reports.
6. **Presentation Competencies**
   6.1 Students will be able to use online Help feature.
   6.2 Students will be able to generate visuals using text and graphics: add graphics; design slide layout; animate slides; time slides; change font style, font size, font color; increase and decrease paragraph spacing; use slide shows to present information textually and graphically; and annotate slides.

7. **Integrating Use of Word Processing, Spreadsheets, Databases, and Presentations**
   7.1 Students will be able to work with multiple software programs – *i.e.*, word processing, spreadsheet, database, and presentation software – on the desktop simultaneously.
   7.2 Students will be able to move information and data among word processing, spreadsheet, database and presentation software.

8. **Computer-based Electronic Communication**
   8.1 All RU students will have e-mail accounts established automatically.
   8.2 All residence hall rooms will have an Ethernet connection.
   8.3 Students will be able to retrieve, process, store and transmit electronic information (*i.e.*, send/receive messages and attachment files, develop aliases, manage files, *etc*.).
   8.4 Students will be able to understand and practice appropriate e-mail etiquette (*i.e.*, respect privacy and understand security and ownership issues).

9. **Internet, Intranet, and World Wide Web**
   9.1 Students will gain a general understanding of the WWW.
   9.2 Students will demonstrate ability to navigate the WWW.
   9.3 Students will be able to conduct research using an Internet search engine.
   9.4 Students will be able to access and download information from the WWW.
   9.5 Students will be able to develop hypermedia “home page” documents that can be accessed by worldwide network (using software such as Front Page).
   9.6 Students will understand the copyright, security, and privacy issues related to the field of information technology on the WWW.
Student Information Literacy Competencies

10. Understanding Resources and Services
10.1 Students should know what types of information resources and services are available to them as Radford students.

10.2 Students should know that librarians and others can assist them in using these resources.

11. Identification of Sources
11.1 Students should be able to formulate relevant questions based on information needs.

11.2 Students should be able to identify a variety of potential sources of information.

11.3 Students should understand what sorts of information can and cannot be found via the computer (based on factors such as date, format, accessibility, subject matter and level of content).

11.4 Students should understand conventions for naming and locating resources (such as call numbers and URLs).

12. Development of Search Strategies
12.1 Students should be able to perform effective database searches.

12.2 Students should understand concepts such as: search term selection, keyword searching, Boolean operators, database content (full-text, abstracts, and citations), thesauri, truncation, nesting, field specific searching and phrase searching.

12.3 Students should be able to look at an unfamiliar information source and develop strategies for learning what it contains and how to use it.

12.4 Students should be able to read and analyze search results and use information contained in results to develop new search strategies.

12.5 Students should be able to recognize the differences between primary and secondary sources and be able to identify when to use each.

13. Evaluation and Citation of Information
13.1 Students should understand the need to evaluate information and sources and be able to describe criteria for evaluation different information resources.

13.2 Students should understand reasons for citing information by knowing the elements common to information and sources and be able to cite a variety of different types of works.

13.3 Students should understand the principles of intellectual property, copyright, and plagiarism and use of information in an ethical manner.

14. Use of Technology to Access Electronically Stored Information
14.1 Students should be able to use the software (e.g. Internet browsers - Netscape, Explorer, etc.) used to connect to and use electronic sources.
14.2 Students should understand the characteristics of different information formats and be able to use software needed to view those formats on multiple platforms. Formats include word processing documents, ASCII text files, PDF files, compressed files, sound files, images, etc.

14.3 Students should be able to copy, save, download, print, or email information from a source and access it later.

15. Using the Library Web Page

15.1 Students should be able to navigate the library web page to find and use materials and information. This will include using the following resources: A) the online catalog for materials owned by McConnell Library; B) the online catalog for materials cataloged but not owned by McConnell Library; C) Interlibrary loan; and D) Library databases available through the Library Web Page.

15.2 Students should understand what materials are included in the online catalog and physically located in the library, and be able to use the online catalog to find and retrieve materials owned by McConnell library (books, magazines, journals, videocassettes, reserve material, etc.).

15.2.1 Students should be able to develop an effective search strategy, do a subject, author, title and keyword search, and revise the search strategy as necessary.

15.2.2 Students should be able to retrieve the materials (books, videos, etc.) found, determine their availability, find them on the shelves, and check them out.

15.2.3 Students should be able to select appropriate material and evaluate the items found to determine if they are relevant and useful for the intended purpose.

15.2.4 Students should be able to apply the information to write research papers or reports or to complete and give presentations on some particular topic.

15.3 Students should understand what materials are included in the online catalog but not physically present in the library. Students should be able to follow cataloged links to web-sites and other resources that are included in the online catalog but that are not physically present in McConnell Library. McConnell Library’s catalog currently contains links to a variety of full-text materials – journals, books, encyclopedias and other electronic texts “owned” (via subscription, through VIVA, etc.) by the library but not physically present in the library. In addition, the library is currently developing guidelines for cataloging specific web-sites produced by non-library groups and organizations. All of these materials will be available by clicking on links present in the catalog. Currently some of these materials are available from the library web page under the link “Electronic Resources,” then “Subject Guide to Electronic Resources.”

15.3.1 Students should be able to develop an effective search strategy, and do a subject, author, title, and keyword search, and revise the search strategy as necessary.

15.3.2 Students should be able to retrieve the material found by clicking on the link in the catalog and going to the site. Information can be retrieved by printing, saving to disk, email, etc.

15.3.3 Students should be able to select appropriate material and evaluate the item found to determine if it is relevant and useful for the intended purpose.
15.3.4 Students should be able to apply the information. This requires students to write a research papers or reports or to complete and give presentations on some particular topic.

16. **Inter-Library Loan**: Students should understand the function of inter-library loan services, establish an inter-library loan account, and use it to obtain needed materials (books, journal articles, etc.) not owned by McConnell Library.

17. **McConnell Library databases**

17.1 Students should be able to use the many databases available from the library web page through a McConnell Library subscription or through VIVA. Examples include: InfoTrac databases, ERIC, Criminal Justice Abstracts, Lexis-Nexus, FirstSearch databases, Dow-Jones News Retrieval, etc.

17.2 Students should be able to use a general bibliographic database to retrieve information on a wide variety of subjects.

17.3 Students should be able to use the core database(s) in their major field.

17.4 Students should be able to use McConnell Library’s Web page and select appropriate databases.

17.5 Students should be able to search the database using an appropriate search strategy. Using subject, author, title, keyword search and revising the search strategy as necessary and when and available, (especially for more advanced databases) use Boolean operators, thesauri, field specific searching, etc., to refine the search.

17.6 Students should be able to select appropriate material and evaluate material found to determine if it is relevant and useful for the intended purpose.

17.7 Students should be able to obtain the materials either through printing the material if available on the database, retrieving the materials from the library holdings, or through the use of Inter-Library Loan services available in the library.

17.8 Students should be able to apply the information.

18. **Other University/Class Web Pages**: Students should be able to navigate the other university and class web page to find and use materials and information. A number of faculty are using their own web pages as a regular part of class work. In general, navigation of these web sites and evaluation of students’ use of them would be a part of the class evaluation. Any special instruction needed to use the web sites would come from the faculty.

19. **World Wide Web**

19.1 Students should have a basic understanding of the nature of the World Wide Web, how web sites are created, how they are searched by web browsers, and how they are located by various search engines.

19.2 Students should be able to select an appropriate Web search engine such as Yahoo, Lycos, Alta Vista, InfoSeek, etc. Students should understand the how the differences among search engines will affect what is found.

19.3 Students should be able to use the search engine in an appropriate manner, searching by using the menu (in Yahoo) or searching key words (in other databases) to find materials.
19.4 Students should be able to look for information about the material found such as author, date of creation, and date of posting, and evaluate materials found for accuracy, relevance, usefulness, appropriateness, etc.

19.5 Students should be able to retrieve the material from the Web, either by printing or downloading it.

19.6 Students should be able to apply the information in writing research papers on some particular topic.
3.2 Technology Based Instructional Methodologies

Current Environment

- Multimedia Supported Instruction
  For several years the University has supported traditional multimedia instruction by placing televisions, VCRs and overhead projectors in most of the buildings and classrooms. In more recent years, the University has begun supporting advanced multimedia instruction and, as a result, many buildings have been equipped with multimedia carts and a number of classrooms have been converted into "electronic classrooms" equipped with fixed multimedia systems and network connections. In addition, the University has opened a Multimedia Center, located in McConnell Library, which provides faculty and students with advanced multimedia technologies, workshops, and consultation to support technology based teaching and learning.

- In-lab and Lab-Supported Instruction
  Radford University currently has a combination of general-purpose labs, shared teaching labs, and special-purpose labs that are used for in-lab and lab-supported instruction. These facilities are described in section 4.2 of this plan.

- Web-enhanced Instruction
  Faculty members throughout the campus currently use the web for both in-classroom instruction and for assignments. Some faculty on campus have piloted more sophisticated applications of web-enhanced instruction, including course materials, quizzes, chat-rooms, and other features which the web can provide.

- Web-based Courses
  Web-based courses have been piloted at Radford University. Currently, the University offers one ongoing course for students in the School of Nursing which has been shown to be as effective as an on-campus course, and one course as a pilot to a limited number of students currently enrolled at Radford University. The University is currently evaluating the role of web-based courses as a means of providing instruction beyond the campus.

- Interactive Video Conferencing
  Radford University currently has two interactive video classrooms that are used for instruction and video conferencing. Several classes are being conducted to reach non-traditional students in various locations throughout Southwest Virginia.
Critical Issues

1. Are the facilities, equipment, software and support for technology-based instruction adequate to provide the methods and quality of instruction that Radford should provide to its students? Technology based methods can provide enriched and more effective instruction only if the infrastructure and training for such methods is available.

2. How can technology enhance faculty-student interactions and the overall educational experiences of students at Radford? Radford has long prided itself on the quality of faculty-student interaction as an integral part of teaching and learning, and on its student-centered educational experiences. It is important that applications of technology for instruction enhance these components of teaching and learning at Radford.

3. How can Radford University use technology to provide instruction to students without regard to geographical restrictions and time constraints?

4. How can the University best provide students with the competencies needed to participate in technology-based instructional methods? While section 3.1 of this plan addresses those competencies which should be a part of our general education and major education outcomes, there are certain technology skills which students need to participate in web-enhanced, distance education, and other technology-based methods of instruction.

5. What changes are needed to the University’s current Intellectual Property policy (see Radford University Teaching and Research Faculty Handbook at www.runet.edu/~pers-web/handbooks.htm) to cover issues related to faculty and staff development of technology based instructional materials? The policy currently does not include provisions that adequately address many of these issues.

Strategic Goals And Action Plan

1. The university will annually evaluate and prioritize needs for improving facilities, equipment, software and support for technology-based instruction.
   a. The ITR Committee shall convene an ad hoc workgroup consisting of representatives of teaching faculty, Facilities Management, and Academic Computing, with responsibilities for annually evaluating and prioritizing needs related to facilities.
   b. The Vice President for Academic Affairs, Deans, and Department Chairs will be responsible for annually evaluating and prioritizing equipment and software needs related to technology-based instruction.
   c. The ITR Committee, working with Academic Affairs and the Director of Academic Computing, will be responsible for annually evaluating and prioritizing support needs related to technology-based instruction.

2. The university will evaluate and support technology-based instructional methods which enhance faculty-student interaction and the overall quality of instruction.
a. By Fall semester, 1999, the university will develop and implement plans for web-enhanced courses including hardware, software, technical support, and faculty training. This implementation will be phased in to provide opportunities for formative evaluation and recommendations for improvements as needed.
b. The ITR Committee will be responsible for identifying, evaluating, and making recommendations regarding other technology-based instructional methods.
c. Faculty with experience and expertise in technology-based instruction will be involved in the ITR Committee's review of these methods.

3. The university will evaluate technology-based instructional methods that provide practical means of delivering programs to students without regard to geographical restrictions and time constraints.
a. The ITR Committee, working with the Director of Academic Computing, the Director of Distance Learning, and the College of Graduate and Extended Education, will be responsible for evaluating and providing recommendations on such instructional methods including such factors as overall costs (startup and maintenance), student demand, marketing requirements, faculty compensation, and infrastructure requirements.
b. Included in this review will be recommendations regarding
   • the video-conferencing infrastructure needed to effectively provide courses across the state network
   • web-based courses, including the option of importing courses, and the infrastructure needs to deliver them
   • other technology-based options for providing distance education

4. The university will identify those skills which students will need to participate in technology-based instructional methods and will evaluate options for providing students with these skills. The ITR Committee, working with the Academic Enrichment Office, will be responsible for identifying these skills and delivery options.

5. The University's Intellectual Property Committee, with input from the ITR Committee, will review the Intellectual Property policy and provide any needed recommendations regarding provisions related to faculty and staff development of technology-based instructional materials.
3.3 Administrative and Ancillary Support

Current Environment

The administrative/ancillary support systems at Radford University consist of multiple systems, both mainframe and PC based. The Finance/HR and Student Records systems, operating primarily on a Hewlett-Packard platform, have integrated links with each other. Major administrative/ancillary support systems include:

Finance/HR:

Internal:
- Interactive Financial Accounting System (IFAS), includes fixed assets
- Human Resource Information System (HRIS)
- Non-interactive, web-based information

External:
- Commonwealth Integrated Payroll/Personnel System (CIPPS)
- Commonwealth Accounting and Reporting System (CARS)
- Personnel Management System (PMIS)
- Benefits Eligibility System (BES)
- Commonwealth Online Budget System (PROBUD/FATS)

Student Records:
- Housing (AFF)
- Financial Aid (AID)
- Demographics (BOX)
- Registration Information Module (RIM), includes Schedule 25
- Student Admissions Module (SAM)
- Alumni/Development Module (XRM)
- Non-interactive, web-based information

Ancillary Systems:
- Automated Fuel System
- Building Automation System
- Diebold Card System
- Dining Services Inventory/Management System (CBORD)
- Dining Services/Facilities Management Time Card System
- Parking Management System
- Police Caller ID System
- Post Office Billing Program/Printing Costing Program
- Printing Lynx System
- Telephone Billing System
- Video Imaging ID System
- Work Order System
- Heth facilities scheduling
**Critical Issues**

1. Should Radford University continue to enhance and improve existing administrative/ancillary processes or consider system replacement?
2. Should Radford University increase availability of electronic communications to the campus community?
3. What is the most efficient and effective mechanism to reduce the handling and storage of hardcopy documentation?
4. How best can administrative/ancillary support information technology personnel resources be allocated?

**Strategic Goals and Action Plans**

1. The current internal administrative systems are meeting university needs fairly well. Although several specific system functions have been identified as not being user friendly and are labor intensive, enhancements are underway so that the systems should continue to be supported. Several of the ancillary systems, however, should be reviewed and considered for possible replacement. Four of the five external administrative systems are currently scheduled for replacement.
   a. Primary system users (Business Affairs and Student Affairs) in collaboration with other university divisions should conduct an assessment of administrative/ancillary support requirements to determine client needs for functionality, system access, and level of user security.
   b. Business Affairs should evaluate specific ancillary support systems (building automation and parking management systems) to determine feasibility of continued use of the current system or replacement.
   c. Based on system implementation schedules of central state offices, Business Affairs should establish an accommodating schedule to install external Commonwealth of Virginia software business systems at Radford University.

2. Current electronic communications applications are limited. Greater emphasis should be placed on making electronic communications an interactive business tool (e.g., e-mail, web applications [registration, access to student records, reporting, procurement], EDI, e-commerce).
   a. Information Technology should allocate the necessary resources to evaluate existing electronic communications and web technologies to determine how best the administrative/ancillary support areas can benefit from utilizing these resources for business processes.

3. At this time, administrative/ancillary system users are required to maintain historical documentation on hardcopy or microfiche. A program to provide a more efficient document archival system should be implemented.
   a. University executive divisions should determine data elements to be stored in a data warehouse and develop a strategy for maintaining appropriate tools to access information.
   b. University executive divisions should evaluate and implement a data imaging software system to reduce hardcopy documentation and storage requirements.
3.4 Information and Communication Applications

Current Environment
The information and communication servers currently employed include Sun Solaris and Intel Windows NT based servers. Major services supported by these servers include:
- Email and Logins
- Web Server
- User Disk Storage
- USENet News
- Printing (NT and UNIX)
- Authentication
- NT Applications and Disk Storage

Critical Issues
1. The current Radford University email system does not allow easy access to email from any Internet location, and 50% of the campus community continues to use terminal based mail packages such as elm or pine. This makes it difficult for these users to send and receive attachments, and the file structure used by these packages does not allow the University to move to some of the more advanced mail protocols with better features and the ability to handle higher volume.

2. There is no well-established way to communicate information about campus events, system updates, or other information to the campus community. Many areas on campus also need calendaring / scheduling software, especially administrative areas and department heads who need the ability to easily maintain their calendar and schedule meetings. To facilitate communication with all of the groups using this software, there should be one common information store.

3. As the number of systems on campus continues to increase, the need to provide users with one username and password for access to all systems and resources on the campus network will become increasingly important. A single sign on is also needed to allow implementation of new software capacities without the need for additional staff to maintain separate password databases.

4. Quotas restricting the amount of disk space a user can consume need to be put in place to prevent an unknowing or malicious user from filling up a system disk and bringing the system down, and to ensure that users have equal access to campus storage.

5. The University currently has insufficient staff to properly maintain existing servers and support research and development for new technologies.
Strategic Goals and Action Plans

1. The University will develop an open electronic mail system that can easily be accessed from any on or off campus computer connected to the Internet, and that allows users to easily send and receive attachments.
   a. Update the campus e-mail system:
      • Implement an interface to allow the use of a World Wide Web browser to access the email system.
      • The email system should provide the following features: (address book, folders, spell check, message deletion, attachments, filters)
      • Phase out the use of elm by Fall 2000
      • Upgrade to an IMAP or other standards based e-mail server that is more efficient than the current POP3 server

2. The University will develop tools that allow campus users to publish and receive news about campus events, announcements, and other information. These tools should be structured to facilitate communication between campus groups, departments, and organizations and to provide calendaring and scheduling capabilities for meetings, rooms, and equipment.
   a. Form a group consisting of representatives from ITR, the ITR Committee, and other representatives identified by the Vice Presidents to help establish what methods of communication need to be implemented and what technologies to use. This group should consider the following:
      • Allow faculty, staff, and campus organizations to create listservs and Usenet News groups.
      • Mirror common listservs to an analogous set of campus information web pages to allow users more options for viewing.
      • Allow faculty and staff to choose whether they want to receive announcements via email or snail mail and target them with the appropriate method.
      • How to promote the use of technology for communication.
   b. Set up a Microsoft Exchange Server for initial testing by Summer 1999 using the Microsoft Outlook client. Initial phases of this project will continue to use the existing mail server as the primary mail server and the exchange server only for scheduling/calendaring. Determine the scope that Exchange is needed on campus by Summer 2000 and target the proper audience for this package.

3. The University will research and develop an authentication scheme that enables a single username and password per user to control access to various campus computing resources.
   a. Establish a team to identify those computing resources that would benefit from the use of single sign on (SSO) technology. (i.e., Email, NT Logins, Web access, access to web based student information, etc.)
   b. Develop a priority plan for packages that can benefit from SSO technology.
   c. Identify potential solutions and recommend a strategy and timeline for implementation of SSO.

4. Promote efficient use of campus computing resources and develop policies to achieve this end.
   a. Establish quotas on disk usage for the email server and web server by Summer 1999.
3.5 Web Communications and Internal/External Relations Applications

Current Environment

Radford University offers full internet access to all students, faculty and staff and provides server space for web sites for individuals as well as for colleges and departments. Internet accounts are established and maintained through Systems Administration and Computer Operations. Most academic and administrative departments on campus currently maintain web sites and links to them from the Radford University Home Page are coordinated by the Public Relations Office. The internet, and specifically the World Wide Web, is an integral part of the university’s plans to distribute information and communicate with its constituents. The services offered through the campus television and radio facilities also will continue to play a vital role in those efforts.

Critical Issues

1. What should Radford University do to ensure that its web sites are current, well designed, attractive and in compliance with relevant policies and laws?

2. How can the University make best use of the internet and other technologies, especially television and radio, in developing and delivering community outreach programs, enhancing student recruitment and alumni relations, and reaching other targeted audiences?

3. What tools should be available to assist users in using the web to communicate and provide content? Should there be a way to synchronize web browser software or to make web-authoring tools available to the campus community?

Strategic Goals and Action Plans

1. The information being distributed through the University's official web pages needs to be kept current and presented in such a way as to be readily accessible to our various constituents without placing undue strain on the university's limited resources in relation to server space and bandwidth.

   a. The university administration needs to ensure that there is a person responsible for each academic and administrative department web site, overseeing development and regular maintenance to ensure that those sites are kept up-to-date and that they are in compliance with university guidelines.

   b. The Public Relations Office’s Director of Electronic Communications should be responsible for coordinating the development of the official university web pages and RU Web Guidelines, with input and guidance from the Information Technology Resource
Committee. The Director of Electronic Communications also should serve as the hub of a communications network involving all departmental web administrators. (RU Web Guidelines are currently posted online at http://www.runet.edu/~clientse/web/)

c. Orientation sessions need to be established for campus web site administrators in which policies and guidelines are explained and information is exchanged.

d. Seminars and training sessions for web administrators, faculty, staff and students also need to be offered on a regular basis.

2. The University will use the internet, television, and radio in developing and delivering community outreach programs, enhancing student recruitment and alumni relations, and reaching other targeted audiences.

   a. Expand departmental and university-wide web page development, and enhance the web site with features such as a virtual tour, secure online transactions (for credit card purchases of university apparel and other promotional items) and departmental intranet development;
   b. Use audio and video to increase the visibility of programs and disseminate information to a majority of RU’s constituent groups;
   c. Produce and distribute educational and informational programs for alumni and community members, as well as training programs and conferences for various on- and off-campus constituent groups, via radio, television and the internet;
   d. Increase promotional efforts via television, radio and the internet, including the expanded use of university-related advertising.
   e. Inform internal and external audiences of existing programming on WVRU radio and Channel 9 cable.

3. The University will develop mechanisms to update web technologies on a regular basis. This will facilitate the use of web technologies and enable users to access the latest technology for web use and content creation.

   a. Automate updates of web browsers and plug-ins as needed on workstations that provide this ability. Provide users with well-documented procedures to update their own computer for all other platforms. Updates should not occur in mid-semester unless warranted by major security problems.
   b. Provide a mechanism for content creators to request plug-ins be added to the list of supported plug-ins for all campus workstations. Update the campus web server throughout the year to incorporate new features and security patches.
   c. Enhance support for a standard set of tools for web creation and determine a set of software tools that will be supported on campus. The campus web server will be used to provide information on these tools.
3.6 Research Applications

Current Environment
University supported software includes:
- Microsoft Office
- SPSS
- SAS
- Maple

with a variety of functions:
- data acquisition
- data analysis
- word processing
- research processing
- presentation of results

In addition, library resources provide:
- journal indexes and abstracts
- electronic databases
- full-text journals and articles
- newspapers
- electronic books and texts
- government documents
- interlibrary loan services
- extended campus services
- monographic acquisitions services
- serials acquisitions services

Various hardware supports campus research:
- library provides portable individual technology such as scanners, digital cameras, video cameras, VCRs, laptops, LCD projectors, for both acquisition and presentation of research
- library provides stationary technology such as a multimedia center and electronic classroom
- Network Services provide the network infrastructure for campus information technology
- Academic Computing and individual departments provide various plotting and graphics devices, scanners, CD-ROM makers, all housed in a variety of departmental and public labs
**Critical Issues**

1. Are current research software and planned acquisitions adequate to meet research needs? Can software and hardware acquisitions be reviewed and standardized for greater efficiency and reliable currency? One example of a deficiency is the lack of bibliographical generating software.

2. Is there adequate information technology staff support and training for individual use of research hardware and software tools? (eg. SPSS and research presentation tools)

3. How can university community communications (both publicity and connectivity) improve efficiency and utilization of a wide variety of efforts in research-oriented technology?

**Strategic Goals and Action Plans**

1. The university will perform a periodic review of information technology supporting research applications.
   a. ITR will conduct a regular review system to assess university supported research software and hardware, with careful attention paid to standardization of devices, appropriate platforms, and campus-wide uniformity. This review will consider whether existing packages (such as two statistics packages) should be eliminated, and whether additional packages (such as bibliographical generating software) should be added. Actual users of the software and hardware will conduct each review. For example, research faculty in statistics and other academic disciplines and institutional research staff will review statistical packages. The Library will conduct a regular assessment mechanism for library technology, both electronic services and training, as well as library materials supporting research.

   b. The university will provide a systematic way of delivering information concerning current holdings, recent acquisitions, and upcoming purchases of software, hardware, and library materials for research.

   c. At this time, the university will keep site licenses to both SPSS and SAS as statistical packages on appropriate platforms since each package is deeply ingrained in research and publications in different disciplines. However, this decision needs to be reviewed on a regular basis as outlined above.

2. The university will assure that hardware and software acquisitions for research include appropriate staff support and user training.
   a. Training and technical support needs to include
      - Staff support to answer specific questions about university-wide supported software (e.g. SAS or SPSS questions)
      - Training with research-oriented software and hardware

   b. New research oriented software and hardware acquisitions will be considered with staff and support needs clearly specified.
4.1 Network, Internet, Modem Pool, and Building Infrastructure

Current Environment

The following is a brief description of the current state of Radford University’s networking facilities:

- **Remote Access:** RU has a total of 184 modems and telephone lines in the modem pool for faculty, staff, and student access to campus network resources when they are not on campus.

- **Connectivity for Off-Campus Departments:** The present method of connecting off-campus University offices is by means of leased ISDN telephone company data circuits.

- **Internet Connection:** RU has one connection to the Internet, which currently runs at 45 Mb/s.

- **Data Networking Facilities:** Radford University has installed a substantial fiber optic cabling system that links all on-campus and several off-campus buildings. RU has recently deployed a 7.5 Gb/s ATM (Asynchronous Transfer Mode) backbone switch, as well as 155 Mb/s ATM-to-Ethernet “edge” switches in most academic/administrative buildings and all residence halls on campus. Users are then connected to the network through these “edge” switches by means of 10Mb/s “shared” hubs. Most University buildings are wired for Ethernet network connectivity with a mixture of wire types and grades.

- **Video Networking Facilities:** Network Services currently provides a dedicated DS-3 (45Mb/s) data line and a switched T-1 (1.5Mb/s) data line to enable the University’s two existing videoconferencing facilities to communicate with other distance learning sites in Virginia. An additional facility for the new Waldron College of Health Sciences building should be operational by the beginning of the Fall 2000 semester.

- **Voice Networking Facilities:** The University leases Centrex analog and digital (ISDN) lines from Bell Atlantic for local exchange service and for access to MCI for all long distance service.

- **Security:** Radford University currently has no full-time security officer. All intrusions into the campus network, campus servers, and personal computers are handled on an as-needed basis by individuals from Academic Computing, Technology Assistance Center, Systems Administration and Computer Operations, Information Systems and Computer Services, and Network Services. The University currently has no network security “firewall” that would limit threats from outside the campus network.
Critical Issues

1. Remote access requirements for off-campus computer users have grown five-fold since 1993. Each of the present 184 dial-in modem connections cost upward of $1,000 in one-time hardware costs and $15-$20 in monthly-recurring line costs, and each is limited to the present 56Kb/s connection speed. How can Radford University provide faster connections and maintain an acceptable grade-of-service to off-campus network users at affordable costs?

2. Several departmental offices are located near the Radford University campus but are not able to connect physically to the main campus fiber network. Network connectivity is by means of Bell Atlantic-leased ISDN data lines, which limit users at those locations to 128 Kb/s, or about 2% of the data rate available to on-campus users. How can users at these locations be better served?

3. Presently, Radford University’s only connection to the Internet is through a data link to the state-wide ATM network known as Net.Work.Virginia. When this Internet connection or any of the associated routing or switching equipment in Net.Work.Virginia fails, all Radford University users lose the ability to connect to any off-campus resource, and off-campus students accessing web-based courses or support material also lose the ability to connect to Internet network resources. What steps should be taken to resolve this issue?

4. What steps should be taken to resolve the following issues of reliability and functionality affecting RU’s campus data network?

   a. Additional single points of failure exist in Radford University’s current networking architecture. These include the ATM backbone switch, the campus network router, and two network servers that control traffic flow and LAN emulation services.

   b. Due to increasing usage of distance learning facilities and to ever-increasing numbers of student-owned computers connecting to the campus network, Radford University must soon upgrade the current 45 Mb/s connection to the Internet and Net.Work.Virginia to a higher speed to handle the increasing volume of traffic.

   c. Ethernet connections in buildings have been activated only as needed, creating user frustration and demands on support staff. As an analogy to electrical outlets, should all visible Ethernet connections in buildings be active?

   d. Several campus buildings are wired with inadequate numbers of Ethernet network connections, again contributing to user frustration and support staff demands.

   e. The lack of appropriate test equipment available to Network Services personnel directly impacts network reliability and functionality. Without proper test equipment, technicians are unable to accurately and quickly resolve network problems.
5. Due to a lack of coordination, planning, and training, instances of Radford University’s inability to connect its distance learning videoconference facilities to remote sites for first and even second classroom sessions have actually occurred. The need for better coordination exists and the ability to connect successfully to all remote sites on-schedule is mandatory if the program is to be successful. Should the University appoint a director to coordinate operational, technical, fiscal, administrative, and training responsibilities for its distance learning videoconferencing facilities?

6. To meet the voice communication requirements of faculty, staff, and residence hall students, the University leases Centrex telephone service from Bell Atlantic at an on-going cost of $600K annually. Should the University replace this service by investing the estimated $1.5M in one-time startup costs and $100K annually-recurring costs necessary to provide telephone service to all on-campus users?

7. Issues of security affecting RU’s campus network and computer users from internal and external sources should be addressed:

   a. As computer hackers become more sophisticated and as infiltration tools become more prevalent on the Internet, the number of hacker incidents has increased, necessitating increasing amounts of time and resources for personnel to deal with the problem. This issue is more acute because of the availability of Ethernet connections in all residence hall rooms and the corresponding increase in numbers of students connecting to the campus network and the Internet. Should the University hire a full-time security officer to deal with threats to academic, administrative, and network-related servers, as well as threats to personal computers used by faculty, staff, and students?

   b. “Shared” Ethernet hubs present security risks because they allow unscrupulous users running “sniffer” software on his/her computer to see other users’ passwords. Since these slow and “unsecure” devices are used throughout the campus network, how soon should the University replace all of its “shared” hubs with more secure, high-speed “switched” hubs?

**Strategic Goals and Action Plans**

1. As newer technologies for remotely accessing campus network resources are proven and deployed in the marketplace, and as demand increases from off-campus network users, Radford University will evaluate and deploy these new technologies as demand and budgets permit. Radford University will also:
   a. continue to maintain the campus modem pool at its present grade of service, with no more than a five percent contention factor during peak hours of utilization;

   b. explore possible partnerships with vendors in the telecommunications industry that may provide off-campus access at affordable rates.
2. The University will connect off-campus faculty/staff offices to the campus network at data rates appropriate to the needs of the office. Off-campus data rates should be at least one-tenth of the rate available to on-campus users
   a. Data transfer methods including cable modem access, high-speed fiber and/or copper telephone line access, and wireless modem access should continue to be evaluated for this purpose.

3. The University will maintain a high-speed primary and a lower speed backup Internet link to provide seamless continuity of access to Internet resources with as little downtime as possible. RU will continue to:
   a. investigate several backup or secondary methods of Internet access, and implement the method that has the best promise of speed, cost-effectiveness, and reliability;
   b. monitor utilization of the Internet to determine when to move to a higher speed primary connection;
   c. evaluate Internet2 connectivity as the cost of membership declines;
   d. investigate partnership and funding arrangements that may be available through federal and/or state governmental agencies, and through private grants, to offset the costs of Internet2 participation.

4. Network Services will provide high-speed desktop connectivity to every campus location, and upgrade edge and backbone components to higher speeds as new technologies are developed to maintain a responsive and reliable network.
   a. Upgrade the present ATM backbone switch to its 10 Gb/s maximum, thus enabling it to serve more campus users.
   b. Procure and deploy redundant network technologies utilizing high backplane speeds and backup communication paths to reduce the impact of device and/or connection failures.
   c. Procure a backup router and backup LAN emulation network servers to guarantee tolerable levels of service to campus network users until failure involving a primary device is resolved.
   d. Alleviate user and support personnel frustration by activating all visible Ethernet connections in residence halls and classrooms by Fall 1999, and all faculty/staff offices by Fall 2000. Connections that do not need to be activated within the next 3-5 years will be capped to prevent user confusion.
   e. Rewire those buildings currently having obsolete cabling by the beginning of the Fall 2000 semester.
   f. Procure the necessary tools and test equipment to enable technical personnel to efficiently carry out their daily job responsibilities, and to quickly isolate and resolve problems and outages affecting the campus network.
5. As interactive videoconferencing facilities are added on-campus and at extended-campus locations, ITR and Networking Services, in cooperation with the College of Graduate and Extended Education, will provide the support needed for the operation of these facilities.
   a. ITR and Networking Services will provide the necessary connectivity to enable communication with all targeted educational institutions;
   b. ITR and Networking Services will obtain necessary training and test equipment for those individuals who will operate, install, and troubleshoot all distance learning and network-related equipment;
   c. The College of Graduate and Extended Education will provide ITR and Networking Services with adequate lead time regarding classroom schedules to ensure that proper resources and sufficient time is allocated in order to co-ordinate, preplan, and communicate with remote classroom sites.

6. Radford University will research the feasibility of utilizing the existing networking infrastructure and switching equipment to provide local telephone service to faculty, staff, and on-campus students. The Network Services Department will:
   a. evaluate the viability of deploying ATM telephone network switching equipment in RU’s campus network.
   b. determine present cost of leased services, initial costs of equipment deployment, yearly recurring services and personnel costs, and the return-on-investment.

7. The University will implement the necessary security precautions to ensure that network activity is secure, reliable, and cannot be compromised.
   a. Network Services will update its section of the INFORMATION SECURITY PLAN FOR RADFORD UNIVERSITY dated March 1998 (available from Information Technology Resources) to ensure compliance with Virginia’s Department of Information Technology requirements.
   b. Network Services will investigate what measures can be taken for security threats from both on-campus and off-campus sources.
   c. Network Services will replace existing “shared” Ethernet hubs with “switched” hubs in all residence halls by the beginning of the Fall 1999 semester, and in all academic/administrative buildings by the beginning of the Fall 2000 semester.
4.2 Computer Labs and Electronic Classrooms

Current Environment
Radford University maintains twenty-eight computer labs containing five hundred computers in support of its academic programs. The labs are divided into three categories:

- General Purpose Student Computer Labs
- Shared Teaching Computer Labs
- Special Purpose Computer Labs

The general purpose labs are co-located in the Walker Technology Center and have extended hours of operation so that students can complete assignments that require a computer. The general purpose labs are available to all Radford University students.

The University also maintains a number of shared teaching labs. Two labs in the Walker Technology Center and one lab in the Library are available to any University Faculty or Staff on a reservation basis. Other teaching labs are located in the various academic buildings and are shared by departments for class instruction. The teaching labs are opened in the evening or weekends as needed to meet peak student demand.

Special Purpose Labs are maintained in support of programs with highly specialized hardware, software, or access needs that cannot be met in the general purpose or shared teaching labs. The Advanced Teaching and Research Lab in the Computer Science Department or the new multi-media development center in the Library are examples of special purpose labs. A complete description of computer labs at Radford University can be found at www.runet.edu/~clientse/labs/.

In addition to computer labs, Radford University currently has two distance education classrooms capable of classroom teleconferencing, three high-end lecture hall multi-media classrooms, nine multi-media enhanced classrooms, and ten mobile multi-media carts. See www.runet.edu/~clientse/rooms for a detailed description. Classrooms and carts are reserved by faculty on first come, first serve basis.

Critical Issues
1. There is a rapid trend toward the use of computer-based presentations, software demonstrations, and World Wide Web browsing in higher education classrooms. How many classrooms at Radford University should be equipped with multi-media capabilities? What role should portable multi-media carts play in Radford's future instructional delivery infrastructure?
2. How should computer lab priorities be established?
3. What additional distance education facilities are needed at Radford University?
4. What process should be used and what guidelines should be followed to arrive at the most effective and efficient designs and placement of multimedia and distance education classrooms?

5. What types of computer labs are needed to support instruction, staff development, and material development?

6. What guidelines are needed so that computer lab supplies, maintenance, support, and upgrade costs do not exceed available resources?

7. What guidelines are needed for staffing computer labs?

**Strategic Goals and Action Plans:**

1. The University will continue to move in the direction of providing sufficient multi-media capable classrooms to meet the rate of change for professors who prefer to utilize that mode of instructional delivery.

   a. Academic Affairs will determine the amount of unmet demand and likely future demand for multimedia classrooms and carts. Some of this data can be gathered from the on-line multimedia cart reservation system.

   b. Information Technology Resources in coordination with Academic Affairs will determine if the unmet demand could be satisfied by better scheduling of current facilities. This should be done by monitoring data from the reservation records on current carts and classrooms, and by recording and reporting on the number of hours that ceiling mounted projectors are run each semester. This information will be made available each year as budgets are prepared for technology acquisition.

   c. Information Technology Resources will limit the assignment of multi-media carts to one per building. Carts are more difficult to maintain and the need for more than one mobile cart in a specific building would be an indication that insufficient classroom technology is in place within the building. Once per year, Information Technology Resources and Academic Affairs should coordinate to consider the removal of carts from buildings that have sufficient fixed technology.

   d. Scheduling procedures must be flexible and fair so that the most efficient use of multi-media facilities can be made. Academic Computing will continue to provide information to the Registrar so that classrooms can be given designations based on the type of equipment available. The designation will be included in the University’s classroom scheduling system so that classes can be properly matched with needed facilities.

   e. Information Technology Resources after consultation with faculty will update the cart reservation system to prevent a single user from reserving a building's cart for an entire semester.

   f. Information Technology Resources or the ITR committee will compute the initial conversion costs and subsequent ongoing annual costs of supporting the number of facilities identified in the previous actions and should also identify a budget source for those costs.
2. Lab priorities should be driven by curriculum.
   a. Decisions about new labs, termination of old labs, and funding for existing labs should be arrived at through a joint effort of the Deans, faculty ITR representatives, University Administrators, ITR staff, and program review. Deans and ITR representatives should be responsible for gathering the necessary input from their respective faculty.
   b. The overall planning and budgeting process carried out by Radford ITR staff and the ITR committee should be such that no lab's equipment or software becomes outdated.

3. Radford University should follow through on current plans for one new on-campus and two new off-campus distance education facilities. Additional distance education facilities should only be constructed when demand warrants the addition of new room.
   a. The Waldron College of Health and Human Services, ITR, and Facilities Management should continue with plans for a distance education facility in the new Waldron College building to support the Title III grant.
   b. The College of Graduate and Extended Education and ITR should continue with plans for new distance education facilities at the Roanoke Higher Education Center.
   c. The College of Graduate and Extended Education should monitor demand for access to distance education facilities and communicate its findings to the Information Technology Resources group and the ITR Committee.

4. The design of multi-media classrooms, distance education classrooms, and multi-media carts should involve input from users, Facilities Management, and ITR so that the most useful, economic, and serviceable facilities possible are configured.
   a. The ITR Committee will convene an ad hoc work group which includes representatives from the above named groups. That committee should have the responsibility for reviewing current designs and recommending new ones.
   b. Once approved, the specific recommendations will be communicated to ITR, Deans, and Facilities Management in order to become part of new building and renovations guidelines.
   c. The Deans and faculty ITR representatives, after consultation with their respective faculty, will work with representatives from ITR annually to determine which rooms should have multi-media equipment added.
   d. Multimedia capabilities will be available in classrooms of a variety of sizes in each academic building rather than only in large classrooms.
   e. ITR will monitor the total number of multi-media classrooms, distance education classrooms, and multi-media carts and should compute the annual costs of maintenance, operation, upgrade, and support, as well as identify a tentative funding sources for each.
   f. Academic Affairs with input from the teaching faculty, Facilities Management, and Academic Computing will construct and maintain a set of principles to help guide the development of specific multi-media facility plans.
5. Radford University will continue to support three levels of computer labs:
   • General Purpose Student Computer Labs
   • Shared Teaching Computer Labs
   • Special Purpose Computer Labs
   as outlined in the December 1997 ITR Committee computer lab position paper (available from Academic Computing).

   a. ITR will continue to co-locate the general purpose student computer labs and several University level teaching labs in the Walker Technology Center after its renovations.
   b. ITR working with Facilities Management will design the renovated Technology Center with sound proof partitions that can allow for configuration of different sized computer labs.
   c. ITR will continue to co-locate the helpdesk in close proximity to the lab after the Walker Hall renovations.
   d. Academic Affairs will consider co-location of statistical consulting services, the writing center, and other complimentary student services near the Technology Center.
   e. The ITR committee, ITR groups, and Deans will encourage the sharing of teaching and special purpose labs between departments in similar disciplines.
   f. Academic Affairs will support the operation of specialized labs where needed, especially the new multi-media development center in the Library, and labs that support programs where computer systems and applications is the curriculum.
   g. The University will support the construction of off-campus labs where necessary but only if a specific support plan is in place for proctoring and maintenance of the lab. Such a support plan should provide for assigned on-site personnel whether provided by Radford University, provide by the host institution, or outsourced.

6. To ensure lab costs do not exceed available resources the University will establish policies to make the most efficient use of computer labs and establish policies to properly identify and measure the cost of computer labs. To do this:
   a. Academic units will only schedule classes to meet in a computer lab when student computing is planned (Once a week for example instead of every class period).
   b. The ITR committee, ITR, and Deans will encourage the sharing of computer labs between departments in similar disciplines.
   c. The ITR committee, ITR, and Deans will periodically review the purpose and usage level of all Radford University computer labs.
   d. ITR will use license metering software where possible to provide a more consistent, more easily accessible, more economical set of software applications to the user community.
   e. ITR will monitor the total number of labs and computers, compute the annual costs of maintenance, operation, upgrade, and support, and identify tentative funding sources for each.
   f. Academic Affairs will define an approval process for the creation of new labs which carefully considers the ongoing costs and how they are to be paid.

7. To the extent possible, computer labs will be staffed by proctors that have some knowledge of the software being used. Training will be provided for all lab proctors.
8. Since 1995 Radford has offered classes to remote sites utilizing electronic delivery technologies. The overriding goal should be to develop a “distributed education” master plan where the education/informational program requirements drives the development of the infrastructure.

a. The University will continue to join with other Virginia colleges and universities to develop guidelines for providing inter-institutional connectivity for distance/distributed education infrastructures, both synchronous and asynchronous.

- The university will continue as an active member of the Electronic Campus of Virginia Cooperative (E-CVA).
- The university will continue working with Virginia Tech and Virginia Community College System (VCCS) technical service personnel to determine statewide ATM technology infrastructure standards.
4.3 Student Ownership of Personal Computers

Current Environment
Students attending Radford University are not currently required to purchase personal computers. The University does communicate the primary benefits of personal computer ownership to students through Web and printed materials. The University also provides hardware configuration and software program recommendations to students who are planning to make such purchases. A Summer 1998 survey of incoming freshman conducted by the University's Office of Institutional Research, Planning and Assessment indicated that slightly more than half planned to bring a PC with them to Radford.

Critical Issues
1. Should Radford University require the purchase of personal computers by all students?
2. If all students are not required to purchase personal computers, might individual programs, departments or colleges set such a requirement?

Strategic Goals and Action Plans
1. At this time, Radford will not require all students to purchase computers. The University will continue its encouragement and support of student ownership and should continue to provide hardware and software recommendations to students who wish to purchase personal computers.
   a. To support student ownership, Facilities Management will continue to evaluate and upgrade electrical power capabilities in the residence halls and maintain the Ethernet connections and electronics in the residence halls.
   b. Academic Affairs will coordinate the communication of hardware and software recommendations to all new students, including transfer students, as soon as possible after their acceptance to the university.
   c. ITR after consultation with Academic Affairs will update the computer recommendations each semester.
   d. ITR will continue providing multiple, prominent links to its computer recommendations on the university web site.
   e. ITR after consulting academic departments will update the University web site to include department specific computing recommendations where they exist.
   f. Academic Affairs will ensure that all faculty are aware of the University's current position and recommendations on computers and of the percentage of students who do own a personal computer.
   g. ITR Academic Computing will include a reminder in the student computer recommendations for students to check their insurance coverage for theft and damage of personal computers and printers housed in residence halls and apartments.
2. Subject to administrative approval, an individual program, department, or college may require its students to purchase a personal computer.

   a. The ITR Committee and Academic Affairs will work jointly to establish the approval process for any program, department or college that wishes to require its students to purchase personal computers.
   
   b. Any recommendation from a program, department, or college to require student computers will require joint planning between Academic Affairs and the University's ITR staff to address any infrastructure issues.
   
   c. Any recommendation from a program, department, or college to require student computers will include a description of how student personal computers will be used to meet the curricular goals of the program(s).
4.4 Library Technology

Current Environment
McConnell Library is a highly technical environment, heavily dependent on technology both as a user and as a provider of technology to the university community. Key components of the current environment include:

1. Library web site
2. Innopac library system.
3. Library instruction: point of use, formal instruction, and library classroom/lab.
4. Electronic Resources.
6. Media and audiovisual equipment and services.
7. McConnell Library Multimedia Center
8. Interlibrary loan system.
10. Satellite taping service.
11. Hardware.
12. Extended-campus services.
13. Library technology staff support.

A detailed description of these components is provided at the end of this section.

Critical Issues

1) How can we ensure that equipment and software is adequate to meet library goals, and that each workstation is appropriate for the tasks to be performed by either staff or library users?

2) As new electronic information products become available, how should the library take advantage of new opportunities for improving and enhancing access for the entire university community? Should funding be reallocated to provide more electronic resources? If so, how?

3) How can we ensure that the library and information needs of distributed-education students are met?

4) What should the role of the library be in supporting the development of targeted technology competencies for students, faculty and staff?
Strategic Goals and Action Plans

1) The library will ensure that equipment and software are adequate to meet library goals, and that each workstation is appropriate for the tasks to be performed there.
   a) Library staff will update the Library Technology plan of 1998-9 at least annually to determine current priorities.
   b) Funding to ensure that equipment and software are adequate to meet library goals will continue to come from a variety of sources: ETF, student technology fees, McConnell Library Fund, and library operating budget.
   c) Library staff will monitor demand for circulating equipment, and budget for additional and/or replacement equipment as needed.
   d) To ensure that needs for circulating equipment such as laptop computers and LCD projectors are met most cost-effectively, equipment intended for circulation should be housed in the library, where it is available to the entire community.

2) The Library Collection Development Committee will provide web-based products, where appropriate and feasible, and observing the library’s Collection Development Policy, to meet the information needs of the entire university community.
   a) Library faculty will continue support for VIVA (the Virtual Library of Virginia), including active involvement in VIVA resource evaluation and selection.
   b) Library will consider replacement of stand-alone CD products with comparable web products, when available, phasing out non-circulating CD products.
   c) The Library Collection Development Committee will, in consultation with teaching faculty, continue to evaluate for cancellation low-use print serials and periodicals. Cost savings will be reallocated to strengthen the collections, including electronic resources.
   d) Library will evaluate print reference resources for replacement with web-based products, as they become available and offer improved accessibility.
   e) Library staff will assess the feasibility of establishing accounts with commercial document delivery suppliers (e.g., Carl Uncover) to provide “just-in-time” periodical articles.
   f) Library staff will assess the need for and feasibility of providing electronic reserves.

3) Library staff will ensure that the information needs of distributed-education students are met.
   a) Library staff will place special emphasis on the identification and selection of full-text electronic resources.
   b) Instruction Librarians will continue to offer instruction supporting off-campus learners, through course-related instruction sessions and through web-based learning (e.g., the Highlander Guide available at lib.runet.edu/hguide and on-line library handouts.)
   c) The Assistant University Librarian will, based on feedback from Reference staff and extended-campus students and faculty, expand the extended-campus web pages to include answers to questions raised by extended-campus students and revise pages to make them clearer and easier to use.
   d) In cooperation with Academic Computing, Instruction Librarians and the Multimedia Center Director will ensure that extended-campus students and faculty have the basic technological competencies required to take advantage of available resources.
i) Explore possibilities for workshops or classes for distance education faculty, to teach them how to teach their students how to locate and use electronic resources that are available to them.

ii) Explore other methods of communicating with extended-campus students and faculty, including V-TEL, video, etc.

e) The Assistant University Librarian and the University Librarian will continue to work collaboratively with staff of other institutions supporting distance education programs to ensure that the library and information needs of RU distributed education students are met.

f) Based on current and anticipated extended-education program offerings, the library will assess the need to establish a new position, that of Extended Education/Distance Education Librarian, to ensure that the library and information needs of extended-education students are met.

4) The library will provide appropriate support for the development of targeted technology competencies for faculty, students and staff.

   a) In consultation with other technology-training providers, the library will assess the need for additional staff and equipment to achieve targeted competencies.

   b) The library will provide leadership in achieving campus-wide information literacy competencies

      i) Reference Librarians will work with faculty, students, and staff in one-on-one sessions to teach information literacy skills at time-of-need

      ii) Reference/Instruction Librarians will work with faculty to investigate ways the library can collaborate with teaching faculty to improve information literacy skills. (especially UNIV100 and ENG102).

      iii) Reference/Instruction Librarians will continue to teach course-related instruction sessions that assist students in developing information-seeking skills

      iv) McConnell Library staff will continue to promote web-based learning (including enhancements and formal evaluation of the Highlander Guide, development of online handouts, access to subject-specific databases and web sites).

      v) McConnell Library staff (Reference Librarians, Multimedia Center Director, and Technology Manager) will continue to offer Our Turn classes and Electronic Information Workshops to faculty, students and staff to promote library resources and reinforce information literacy skills.

   c) The library will provide information systems that support independent, self-sufficient learning through the continued improvement of library web pages, the selection of easy-to-use electronic information resources, the continued cataloging of electronic journals, and continued enhancement to the Highlander Guide.

   d) The library will support the achievement of other technology competencies (that is, other than information literacy competencies) identified in this plan by:

      i) Providing ongoing funding for library materials (books, training videos, tutorials, etc.) that specifically support development of targeted competencies (business applications, web publishing, etc.)
ii) Reference staff will continue providing point-of-use instruction on email, browser use and other applications, and will attend workshops designed to strengthen the competencies for faculty, staff and students.

iii) Library computer lab/classroom proctors will enhance their ability to resolve problems and answer software-related questions by continuing to attend workshops offered by Client Services.

iv) Library staff, including Reference and Reference/Instruction Librarians, will actively advertise that the library classroom is available for faculty to schedule sessions for hands-on training sessions to support teaching and learning of targeted technology competencies.

v) Library Media staff and Multimedia Center staff will offer formal and informal instruction and assistance in media development competencies.
Detailed descriptions of McConnell Library components:

1) **Library Web Site.** Library web pages, which provide access to the library catalog, all VIVA and RU subscription resources, Interlibrary Loan, and Library information and services, are supported by an NT Server (Dell Power Edge 4200/300). This server also supports McConnell Intranet services.

2) **Innopac Library System** supports a public catalog, both web and character-based versions, circulation, reserves, cataloging, authority control, serials control, acquisition (of library collection materials), management reporting, and materials booking. The catalog includes both Teaching Resources Center and McConnell Library materials, and the TRC shares the Innopac cataloging and circulation systems. Innopac modules interface electronically with the OCLC (Online Computer Library Center) system for sharing cataloging records, and with monograph and serial vendors for ordering, claiming and invoicing.

3) **Library Instruction: point of use, formal instruction, and the Library Classroom/Lab.** Reference staff promote the information literacy of students, faculty, and the public users with point-of-use instruction. Most of the 55,000 inquiries handled at the Reference Desk each year (including e-mail and telephone) are software or computer related. Forty-four computers are available for student use in the Reference area, with 20 additional computers from the classroom during evening hours. Library Instruction sessions (about 200/year) on the use of McConnell Library’s electronic and print resources are offered throughout the year, usually in Room 350. The COMWEB in the library classroom/lab connects all 21 workstations to a control panel, which allows the instructor to take control of any number or all of the student monitors, providing an excellent teaching environment. Projection equipment is also available. Computers contain the same software as in the General Computing Labs. The room also functions as a teaching lab which faculty are encouraged to schedule for occasional use for computer-related instruction and as a general computing lab which supplements the Walker labs and library public workstations during most evening and weekend hours.

4) **Electronic Resources.** The library provides access to over 150 electronic databases: statistical databases, text collections, news sources, journal indexes, abstracts, government information sources, and a steadily growing number of full-text journal articles. Through these resources, users can access citations to thousands of articles, as well as selected full-text articles and documents. Licenses to use these resources are purchased, either by VIVA (the Virtual Library of Virginia, a consortium of college and university libraries) for the use of VIVA members, or by Radford University for the use of the RU community. Of the electronic products the library provides, 26 are CD-ROM products available on workstations in the library; the remainder are web-based and are available on the RU campus network and can be accessed from off-campus (via the modem pool or the proxy server) by the RU community.

5) **Technical Services: acquisitions, serials, and cataloging:** The Internet and campus network are critical resources for technical services, providing for communication and commercial
transactions with serials agents, booksellers, and supplies vendors, electronic ordering and invoicing, and record transfer to and from the OCLC cataloging database.

6) **Media and Audiovisual Equipment and Services.** The library provides equipment for viewing and using its AV and microform collection materials, as well as scanners, transparency and slide production, lamination, and conversion of various international videotape formats. Faculty can arrange for classroom video viewing, using either the closed circuit TV system, or by checking out the videotape. Equipment is also available for checkout. Equipment and videotapes may be booked in advance.

7) **The McConnell Library Multimedia Center** has been planned to meet the technology training needs of faculty, staff, and students. It provides leading edge hardware, software, peripherals, and technical expertise for the RU Community to learn to create multimedia projects such as audio, video, and graphics to enhance the quality of teaching and learning. The Multimedia Center will support not only the production of multimedia projects but also the delivery of these through a wide variety of delivery methods such as CD-ROM, web, presentation software, DVD, etc.

8) **Interlibrary Loan System.** The all-electronic interlibrary loan system, ILLiad, allows RU students, faculty and staff to request, via the web, materials that are not available locally or online. Users may also check the status of their requests via the web, and, when the requested material is delivered to Radford electronically, can view and/or print their requested journal article online. ILLiad is mounted on a dedicated NT Server (Dell Power Edge 4200/300). As a member of OCLC, the library is able to obtain materials from over 25,000 libraries worldwide utilizing the OCLC Interlibrary Loan subsystem. Ariel software is used for scanning, compressing, and delivering documents over the Internet.

9) **Assistive Technology.** The library provides a VIEW (workstation for visually impaired) with screen reading capabilities, voice recognition, and general lab software including Office 97. The workstation provides text-to-voice capability and Braille printing from electronic or print sources. Screen magnification and other magnification tools are also available.

10) **Satellite Taping Service.** Media Services provides downlinking and teleconferencing services and arranges for licensing and taping of programs.

11) **Hardware.** The library currently maintains 5 servers, which support the Innopac library system, the ILLiad interlibrary loan system, the reference/classroom subnet, the library web server, and the library proxy server. There are 146 computers, 149 printers, 10 scanners and a number of other peripherals and terminals. Computers range from 386's and 486's through Pentium II 450's. In addition, the library provides circulating equipment such as laptop computers, camcorders, projectors, etc. to faculty and a range of circulating equipment to students.

12) **Services to Extended-Campus Students and Faculty.** To provide for the special needs of those in extended-campus programs, the library offers (in addition to the usual services)
a) the ability to request electronically any circulating item or journal article from the McConnell Library, and to receive it at home.
b) remote authentication, permitting any RU student, staff or faculty using a commercial internet service provider to access all subscription databases and products that are available to RU and VIVA users. An NT server supports the proxy service.
c) Agreements with partner libraries at some remote sites to provide some services.

13) **Library Technology Staff Support.** Library positions primarily related to technology support include that of Technology Manager, Assistant University Librarian for Systems, Multimedia Center Director, and Audiovisual Technician. Responsibilities for web page design and maintenance are spread over several positions, including Reference/Instruction librarians and the Coordinator for Technical Services and Technical Services staff.

14) **The George Harvey Health Information Resource Center.** The Library and Waldron College personnel are currently engaged in planning for the George Harvey Health Information Resource Center, a state-of-the-art center providing highly specialized information in the health and human services discipline, as well as a COMWEB teaching classroom. The Resource Center will serve students, faculty, clients attending Waldron College clinics, clinics throughout southwest Virginia, and community partners such as Carilion New River Valley Medical Center. One of the planning goals is to avoid costly duplication of what is available in McConnell Library.
4.5 Radio and Television Infrastructures

Current Environment
Radio and TV Communication Services provides the university with radio and television services, and it provides the university with audio/visual machine management and electronic machine repair services for radio, television and computer equipment.

Radio and TV infrastructures include televideo production/television facilities, FM broadcasting and radio program production, the CATV campus system, Channel 9 (on local cable television), and the university’s satellite receive station. Televideo production studios housed in Porterfield Hall are fully equipped with state-of-the-art video and sound recording machinery. WVRU-FM (89.9 MHz) is the University owned and student operated educational, non-commercial radio station. Channel 9, the University access channel on American Cable Entertainment in Radford, Christiansburg and parts of Pulaski/Montgomery Counties, is operated by Radio and TV staff.

Radio and TV Communication Services offers programs and services that help extend the academic and service mission of the University.

A more detailed description of the components and resources for Radio and TV Communication Services is given at the end of this section.

Critical Issues
1. What is the plan for integrating televideo technology resources for teaching/learning and external relations in the 21st Century which reflects the priorities for all of the university constituencies?

2. What competency development opportunities and supporting infrastructures should WVRU provide students in light of the characteristic changes that are taking place across the country in “radio” today; and how can WVRU continue to serve the outreach mission of the university?

3. How will the internationalizing of the curriculum, and an increased necessity for information and entertainment programming impact satellite technology needs?

4. How will RU determine the need for internal and external (outreach) cable TV programming after the existing “service agreement” ends on 12-31-2001?

5. How will RU plan and implement “distributed education” across its service area in the absence of a statewide vision for distance education and statewide standards of technology for interactive electronic interconnectivity; and, what is Radford’s strategic plan for distributed education?
Strategic Goals and Action Plans

1. At this time there is not a satisfactory plan for coordinating televideo resources; constituency groups are autonomous. The goal is to have an integrated approach to the acquisition and management of televideo resources across the university.
   a. The university will appoint an ad hoc advisory group to:
      • ascertain existing needs and expectations for televideo production.
      • develop a plan for providing interdepartmental televideo technology resource needs for the future.
      • identify and describe roles and responsibilities related to televideo resources and activities

2. Evaluate and restate the mission of WVRU and audio production at Radford University with a distinct emphasis on student competency development, internal/external relations, and community outreach/service.
   a. The University will appoint an ad hoc advisory group to:
      • ascertain existing needs and expectations for WVRU.
      • develop an audio production/radio programming plan addressing existing needs based on the mission statement.
      • research and develop a model, and establish guidelines for current and future university involvement in the audio production/distribution media for WVRU and web-casting as a significant outreach tool.

3. Radford University will continue to use off-satellite programming in support of a diverse curriculum and to enhance the quality of life on a residential campus. The goal is to continue to manage and upgrade the satellite receive/distribution system (SDS) well into the next century (10 years).
   a. Explore ways to move toward automation.
   b. Determine a (permanent) location for satellite dishes and head-end.
   c. Redesign the SDS to meet the technical requirements of internationalizing the curriculum and perhaps, campus TV expectations.

4. Since the University owns its own cable television plant and since the current TV service agreement ends on December 31, 2001, the university will:
   a. Develop a business plan for cable television as a university auxiliary. This process is already underway under the direction of IT staff and others and this plan should be ready to implement by October of 2001.
   b. Appoint a university wide ad hoc committee to plan for future programming needs and explore suitable alternative programming sources for Channel 9.
Detailed Descriptions of Radio and TV Communication Services Infrastructure Components

• **Televideo Production Systems**
The studio complex in Porterfield Hall includes, (2) SONY 327 camera systems w/ tripods & dollies, ROSS RVS-216A video switcher, MACKIE CR 1604-VLZ mic/line audio mixer, PANASONIC AU-65H MII VCR, CALAWAY 411 “on-line” editor, PINNACLE Sx21 work station, MAC G3 Graphics workstation and MEDIA 100XS “on-line” digital editor w/ a MAC 9600/233 with 16 & 36 gig raid towers and 9 gig external hardrive . The field system consists of a SONY D30 camera and PANASONIC AU 55H VCR.

• **FM Radio Station and Audio Systems**
WVRU radio broadcasts with a QEI FM 500-watt stereo transmitter. The audio production mixing consoles consist of two Radio Systems, Inc. 12 channel and 16 channel boards. Audio processing is provided by an Orban Optimod stereo generator/limiter. Digital carts, reel-to-reel machines, professional cassette players, turntables, microphones and accessories provide a full support compliment. Analog formats no longer are available via satellite; nearly all program providers have digital transponders. During FY98 WVRU began to implement a plan to allow reception of new digital signals. Also with FY98 ETF funds, a three phase upgrade to an automation system has been implemented.

• **Satellite Distribution Systems**
Radford University has four satellite receive only systems consisting of two Harris 6502 receivers, a General Instruments model 4400 digital PBS receiver and a Microdyne SCPC audio system for radio broadcasts. Remote signal distribution is provided with a fiber optic video link to the Radford University library.

• **CATV and Channel 9 Systems**
The Radford University cable television system via a service contract with CableVision Communications, Inc. delivers approximately 1800 drops around campus, supplying 53 channels composed of entertainment programming and 5 instructional channels with satellite teleconference delivery capability. Four dish antenna provide educational program feeds: Ku band fixed dish (3-ft) system for digital feeds direct from PBS Adult Learning (PBS/General Instrument); Analog C and Ku dish (13-ft) system remote controlled from the Library for analog downlinks( Comtech System); and, two Analog and Digital C and Ku dish (10-ft) system for utility and back-up use and Channel 9 (Scientific Atlanta and Harris Systems). The current “Cable Television Service Agreement” ends on December 31, 2001.

RU operates leased access channel 9 that is automated with a Leightronix 8 channel computer operated programmer, a Mycro-Vision character generator, two Panasonic AG-1970 S-VHS tape recorders, and two Sony VP 7000 series 3/4 inch videotape machines. The system also combines TLC programming from an Analog C only (10-ft) dish (Harris System). Channel 9 is fed to the local cable company via fiber optic cable.
5.0 Technology Acquisition Plan

Current Environment
In the present environment, there is no one place or person to administer the procurement of technology-related products. For example, a department chairperson may contact:

- Materiel Management and Contracts for items on state contract and pricing,
- Systems Integration for items on state contract and pricing as well as recommendations for certain hardware/software,
- Client Services for recommendations for hardware/software, and
- Telecommunications for recommendations for audio-visual equipment.

In this environment, no consistent set of standards exists. Systems and equipment can be purchased that are duplicates of something we already have, are not compatible with our existing systems (for example, different word-processing programs), or are not serviced or supported by our support staff.

Some minimum specifications are posted and updated as needed for special orders (for example, the Equipment Trust Fund) and for student computer purchases. Client Services has also specified some hardware that must be purchased such as 3Com network cards and Permedia video adapters, but minimum configurations are not widely posted or communicated among the parties listed above, or to academic departments.

Critical Issues
The current environment raises the following issues:

1. Does Radford University have a consistent set of policies and standards that addresses the procurement of technology products?

2. Is hardware, software and audio-visual equipment compatible and coordinated among departments and colleges?

3. Do we have an overall needs and deployment plan, since computers may come from different funding sources (departmental budgets, Equipment Trust Fund)? Can planning at the department level be consistent with planning at the University level?

4. How can we eliminate outdated equipment and keep surplus equipment from re-circulating back into the hands of users, since technical support no longer services the equipment or must spend inordinate time doing so?
Strategic Goals and Action Plans

1. The university will set consistent guidelines for the selection, procurement, and life span cycle of all technology.
   
a. The ITR Committee will establish a university-wide workgroup to develop and annually update these guidelines. This workgroup will make its recommendations to the Vice Presidents by January 15th of each year. After approval, these procedures should be completed and distributed to the university community.

b. The specific duties of this workgroup will be to:
   - As a priority, recommend the approval procedures for purchases of all technology equipment and software.
   - Recommend minimum standards and specifications for all technology related purchases: audiovisual equipment, computer hardware and, and computer software.
   - Develop and distribute a “menu sheet” describing the system make, dimensions, design, etc. to the university.
   - Evaluate site licenses for software purchases.
   - Recommend the office productivity software that the university will support through installation, training and support.
   - Recommend policies regarding surplus equipment.
   - Develop and implement a standardized on-line computer inventory system.
6.0 Faculty and Staff Development Plan

Current Environment
The University currently offers opportunities for faculty and staff to learn new technology skills, enhance their current ones, and have input on the types of services they need. Several offices and departments are responsible for determining training needs, communicating training opportunities, and providing technology training, but these efforts are not coordinated. The training programs are offered at a variety of times during the year, primarily through workshops. Most of the training programs are offered as a result of informal needs assessments, previous attendance at particular workshop topics, and the recommendations of topics by persons who are willing to provide such workshops. The University has not identified the major technology competencies needed by all faculty and staff.

Critical Issues
1. Is technology training adequately coordinated? Currently, a centralized entity does not coordinate training opportunities. As a result, some training needs are not met, duplication occurs, and resources are not maximized.

2. Is technology training based on the needs of faculty and staff, given their job responsibilities, and is it integrated with their development plans and evaluations? Currently technology training is not adequately tied to job responsibilities nor is it sufficiently a part of development plans and evaluations.

3. What are the major technology competencies needed by all faculty and staff at the University? Similarly, what are the specific technology competencies needed by particular groups of employees such as all departmental secretaries?

Strategic Goals and Action Plans
1. The ITR Committee, with the approval of the Vice Presidents, will appoint a workgroup to centrally coordinate training opportunities so that they are integrated, responsive to current needs, available through various learning options, and clearly communicated to all faculty and staff.
   a. The ITR Committee will appoint the workgroup, a joint faculty and staff team, during spring 1999.
   b. During Summer, 1999, this workgroup will identify strategies for needs assessments, training options, scheduling, and communicating training information to all faculty, staff and supervisors. Training options considered should include peer-to-peer training, on-line tutorials, and web-based help materials.
c. Needs assessment strategies and instruments will be developed by this workgroup and implemented annually to identify the major technology training needs for faculty and staff.

d. This workgroup will annually coordinate and communicate faculty and staff training activities in conjunction with other units of the University including ITR, the Personnel Office, the Faculty Development Center, and McConnell Library.

2. Technology training for faculty and staff will be based on job responsibilities and will be integrated with development plans and evaluations.
   a. Professional and classified staff members, working with their supervisors, will identify and incorporate into their annual performance plans those areas of technology training which are most needed given the person's current skill levels and job responsibilities.
   b. Supervisors of professional and classified staff members will work with their staff to identify appropriate staff development opportunities based on the training opportunities that are available and the individual's needs.
   c. Faculty will identify the technology training and development activities relevant to their professional responsibilities within their Faculty Annual Reports.
   d. Evaluations of faculty and staff will incorporate the individual's technology development activities and outcomes.

3. Technology competencies needed by faculty and staff will be identified and regularly updated.
   a. Included in this document (p. 57-60) is a draft set of basic technology competencies for all faculty and staff as well as a draft set of technology competencies related to particular job functions.
   b. This draft sets of basic technology competencies for faculty and staff will be reviewed to elicit feedback that can result in revisions and eventual adoption by the end of Fall semester, 1999. This review will be coordinated by the ITR Committee and submitted to the Vice Presidents for approval.
   c. The adopted set of basic technology competencies for all faculty and staff will be distributed to all personnel and will be one of the major criteria for determining technology training needs.
   d. The set of basic technology competencies for all faculty and staff will be reviewed periodically by the ITR Committee to ensure that these competencies are in line with changes in technology at the university.
General Technology Competencies for Faculty and Staff

Communications - how one communicates with others in their office and across campus.
* E-mail
  - send and read messages
  - send and read attachments
  - create signature files
  - create and maintain alias or nicknames
  - able to subscribe and unsubscribe to listserve
  - able to use filters
  - understand E-mail etiquette

* Web browsing
  - understand different browsers
    - able to navigate a web browser
  - able to conduct effective online searches and validate the validity of the information found on the WWW
  - able to access and download information from the WWW
  - able to use bookmarks/favorites

* Web publishing
  - able to create and maintain a professional web page
  - able to insert a graphics into a page
  - able to create and distribute PDF documents
  - able to use to solve education problems
  - able to use to enhance classes
  - practice copyright ethics

Business Applications – skills to perform your daily job
* Word Processing
  - able to use online help features
  - able to create a document
  - able to use a spell and grammar checker
  - able to use a thesaurus
  - able to create tables
  - able to format documents: change font style, font size, color, margins, line spacing
  - able to use built-in templates
  - able to import files
  - able to save a document to floppy, zip, and hard drive
  - able to convert document to older versions or another application

* Spreadsheet
  - able to use online help features
  - able to set up a spreadsheet to solve a problem (budget or grade book)
  - able to enter data
  - able to enter text
  - able to format values (percentages, currency, dates, etc.) and text (font style, size, color, lines, borders)
- able to insert and delete columns and rows
- able to copy (cut) and paste
- able to perform calculations
- able to extract information
- able to generate graphical representations of data
- able to print spreadsheets

* Presentation software
- able to use online help features
- able to generate visuals using text and graphics: add graphics; design slide layout; animate and time slides; change font style, size, color; change paragraph spacing
- able to use slide shows to present information textually and graphically
- able to annotate slides
- able to create a multimedia presentation

* Database Management System
- able to use online help feature
- able to design databases
- able to enter and maintain data
- able to sort data
- able to query data
- able to create forms
- able to generate reports
- able to print tables, forms, reports, and labels
- able to use a number of reports

* Integrate Word Processing, Spreadsheets, Databases, and Presentations
- able to work with multiple software programs (word processing, spreadsheet, database, and presentation software) on the desktop simultaneously.
- able to move information and data among word processing, spreadsheet, database and presentation software

General Skills
* File Management
- able to "map" another computer or server on your desktop
- able to move files from your computer to another computer
- able to "backup" your files
- able to create logical structures
- able to do file naming and extensions

* Help
- able to use software and web based online help
- able to provide the Computer Help Desk with computer problems: name of the computer, their RU ID number, the operating system, memory, exact error message they are receiving, any changes to their computer prior to this problem, application problem,

* Using your computer
- able to navigate the desktop to include creating shortcuts or aliases, using the task or menu bar, drag and drop, multi-tasking abilities
- able to use windows explorer or Find command to find files
- able to print documents
Specific faculty and staff competencies related to particular job functions

Communications – how one communicates with others in their office and across campus.
* Phone (ISDN)
  - setting up mail box
  - recording messages
  - retrieving messages
  - deleting messages

Media Development – scanning documents, pictures and image-processing software.
* Scanning images
  - able to scan an image on a flatbed scanner
  - able to scan a slide from a slide scanner
  - able to crop the scanned image or slide
  - able to save the file to the appropriate file extension
* Image Processing
  - Understand and experience using the toolbar.
  - Understand and experience using the layers feature.
  - able to crop a scanned image.
  - able to convert images to other file extensions.
* Copyright
  - understanding Fair Use as it applies to Educational Multimedia
  - understanding Intellectual Property

Classroom Equipment – operation of equipment used in teaching classrooms.
* Computer-based classrooms (room with ceiling mounted projectors)
  - able to turn-on and use the computer connected to the projector.
    -- Insert a floppy or zip drive and open a presentation.
    -- Open a Web browser and navigate the Internet.
  - able to use the remote control or touch screen display to switch between input devices.
    -- Switch between VCR, computers, laserdisc player, slide projector.
    -- Switch between projectors.
  - able to use the Visual Display Device (Elmo or Cannon) connected to a projector.
* Hardware
  - able to operate a laserdisc player with frames, units, and barcode reader.
  - able to use a VCR to play a tape, select channels.
  - able to operate a slide projector.
  - able to use an overhead projector.

Distance Learning Classrooms
* Hardware
  - able to turn on the VTEL system.
  - able to operate a VCR to play a tape, select channels.
  - able to operate a slide projector.
  - able to turn on/off and use a visual display device (Cannon or Elmo).
**IFAS** (Accounts Receivable (AR), Accounts Payable (OH), Check Management (CK), Encumbrance (EN), Fixed Assets (FA), General Ledger (GL), Human Resources (HR), Person/Entity (PE), Purchasing (PO), Stores Inventory (SI))

* General
  - able to enter a purchase requisition
  - able to enter a travel voucher
  - able to move from one screen to another
  - able to create a new or modify an existing screen
  - able to retrieve information from an IFAS subsystem. For example
    a. General Ledger for budget reports.
    b. Person / Entity for vendor name, address, information, etc.

* Based upon the employee's responsibilities.
  - able to log onto IFAS.
  - able to use the IFAS menus.
  - able to print purchase orders and travel reimbursement vouchers.
  - able to run reports from IFAS.
  - able to do inquiries on financial data in IFAS.
  - able to create or distribute batch files in IFAS.
  - able to do other job-related functions in IFAS.

**IRIS** (Housing (AFF), Financial Aid (AID), Demographics (BOX), Registration Information Module (RIM), Student Admissions Module (SAM), Alumni/Development Module (XRM))

* General
  - able to log onto IRIS through IFAS.
  - able to use the IRIS menus.
  - able to run reports from IRIS.
  - able to do inquiries on student records in IRIS.
  - able to do other job-related functions in IRIS.

* Based upon the employee’s responsibilities
  - able to use specialized software required by your job description.
7.0 Technology Support Plan

Current Environment

The present support environment consists of the following:

• The Computer Help Desk provides walk-in and telephone support to all University faculty, staff, and students and on-site assistance for all faculty, staff, and lab computers. The Help Desk attempts to resolve user problems over the telephone. If this is not possible, they dispatch the necessary on-site service for faculty, staff and lab computers.

• Residential Life has established a group of students to assist in resolving network-related problems for on-campus students. The Help Desk refers problems to this group if the problem cannot be resolved over the telephone by the helpdesk.

• Network services works with all of the support groups to activate network connections and troubleshoot network related problems. At this time, not all network ports are active and other support staff often require the assistance of the networking group to determine if a network connection is active and working properly.

• Electronic Machine Repair (EMR) provides hardware upgrade and repair services for microcomputer systems, printers, telecommunications equipment, video cameras, VCR’s, TV’s, video projectors and other major types of electronic equipment. EMR also provides maintenance and support for campus video systems, satellite communications, campus electronic classrooms, distance education facilities, and campus CCTV, CATV, and fiber communications.

• Information Systems and Computer Services provides support for the administrative applications such as IFAS, RIM, etc. The user often contacts the programmer responsible for the application for support of these applications.

Critical Issues

1. A well-defined method of notification about campus-wide technology problems, updates and changes does not exist.

2. As the use of technology in instructional delivery expands, so does the need for a well-defined support structure to help users deal with problems that arise when using these technologies. (multimedia carts, multimedia classrooms, TV-VCR’s, distance education rooms, etc) Some of the problems that should be resolved include:
   • emergency help (How do faculty get immediate attention when using a room, and what rooms warrant immediate attention.)
   • scheduling (Rooms need to be scheduled so that the equipment is used to its fullest potential, and scheduled to allow some time for support staff to perform repairs and maintenance.)
   • upgrades (How do we perform upgrades to keep rooms current and make as few changes as possible so faculty do not need additional support in learning to use the updated equipment.)
   • maintenance and repairs (What level of preventative maintenance should take place in these rooms?)
   • ownership (Who is responsible for rooms and multi media carts?)
   • location of equipment (Where should carts and other moveable devices be placed?)
• training (Who needs training and what level of training should be provided?)
• instruction sheets (Who should develop instruction sheets for rooms?)
• user feedback mechanism (How do users provide feedback about equipment and rooms?)

3. A high level of support and a large amount of time are required to maintain departmental labs, which are an integral part of departmental courses. This problem is exacerbated because of a lack of intra-college and intra-departmental software and hardware cooperation.

4. The current level of staffing affords little time and limited resources to assist faculty with their technological needs in the area of instructional development. Faculty need to be aware of what services are available and how to utilize those services.

5. The University community does not use or recognize a standardized suite of office productivity tools, thus making it difficult for the support staff to provide adequate answers to many of the questions that arise. A lack of standardization inhibits the sharing and distribution of electronic documents, forms and other materials.

6. What do users do when they have a problem with one of the administrative applications?

7. There is no mechanism to identify the boundaries of the services the Computer Help Desk provides to students, faculty and staff.

8. The current process for diagnosing, repairing and returning defective hardware components typically requires a minimum of one week. ITR must reduce the time from the moment the problem is reported until the item is returned to the user.

9. In order to maintain a four-year replacement cycle for the University's computers, the University must replace at least 200-300 computers each year. The setup and installation of a new computer is also typically followed by the relocation and reconfiguration of two or three older computers, thus requiring the support staff to spend many hours installing one "new" computer. This setup includes moving data, peripherals and reinstalling specialized software packages.
Strategic Goals and Action Plans

1. Technology updates, changes, or additions will be communicated to a departmental contact who is responsible for using the necessary communication tools and disseminating the information to the remainder of the department.
   a. ITR will develop and maintain a list of departmental contacts (secretaries, support personnel, resident directors, etc.). Departmental contacts will be the first contact for any technology-related information that needs to be quickly communicated to the campus community.

2. ITR will provide efficient responsive support for instructional delivery equipment.
   a. Establish an Instructional Delivery Advisory group consisting of one person from the Help Desk, Machine Repair, Faculty Development Center, Registrar’s office, one Graduate Student, and one faculty member from each college to make recommendations to the Director of ITR. This group shall:
      • Determine how emergency contacts for problems with this equipment will be handled
      • Determine what software will be installed on the computers
      • Provide information on loading additional software
      • Devise plans for scheduling of rooms or equipment
      • Decide location and composition of multimedia carts
      • Develop and distribute training and instructional sheets
      • Set standards for upgrades maintenance and support
   b. Enhance the use of remote administration tools to assist in managing instructional delivery equipment.
   c. ITR with input from the faculty will determine what level of support should be provided during non 8:00am – 5:00pm hours to support and maintain instructional delivery equipment.

3. To enhance the use of technology in instructional curriculum, the University will provide the necessary support for specialized and departmental computer labs. Departments and colleges shall receive assistance with software standardization where needed.
   a. Recognizing that specialized computer labs not only have unique hardware and software needs, but that extra support is also required for this equipment, the University will employ the necessary personnel to properly maintain these expensive labs. These personnel will work with departments and colleges to assist with software standardization where possible.
   b. Software that is used by multiple departments will be supported on a University wide basis and be available in all campus computer labs.

4. ITR will provide faculty with assistance incorporating technology into their courses.
   a. Provide the proper resources to support faculty needs when developing technology-based instructional materials.
   b. Establish and continue to update a list of instructional development services available on campus to guide faculty to the proper resources.
5. The University will provide support for a standard suite of office productivity tools (word processing, spreadsheet, database, presentation, web browsing, email, etc.) and provide enhanced documentation, support and training for these packages.
   a. ITR shall insure that all support staff have a minimum level of proficiency on the standard office productivity tools.
   b. ITR will work with departments using the standard productivity tools to develop templates and other tools to enhance office productivity.

6. Additional training and documentation will be provided to help reduce Administrative Computing support requests. Also, to the extent practical, Administrative Computing will use a single point of contact for problems to improve customer service and to minimize the number of disruptions experienced by the programming staff.
   a. For routine requests for assistance, ITR will create one point of contact to manage those calls. Requests requiring immediate attention can still be directed to the programmers best able to diagnose and resolve client issues. Programmers will be assigned to cover support issues for each individual module within the administrative system.
   b. ITR will provide additional training and documentation to help reduce support requests
   c. ITR will provide workshops, web-based tutorials, office manuals, tips & tricks, etc. to reduce the number of support calls.

7. The University will clearly define the role and support services that the Computer Help Desk provides.
   a. ITR in conjunction with the ITR Committee will develop a document that identifies what services the Computer Help Desk is able to provide and clearly defines the responsibilities of the Computer Help Desk.

8. ITR will develop methods departments can use to cope with hardware failures, and improve the hardware repair process to reduce the time required to diagnose and resolve hardware problems.
   a. Departments will develop a contingency plan that outlines what resources are available within the department or building for departmental staff who are without equipment.
   b. The University will insure that EMR has the necessary resources to minimize turnaround time on equipment repair.
   c. ITR will explore methods to provide a faster return of repaired equipment to departments especially for items that require diagnosis by the help desk, repair by machine repair, software reconfiguration by the help desk, and then finally return to the user.

9. ITR will develop a streamlined method for dealing with receiving and delivering computers to meet yearly demand.
   a. The University will employ additional personnel responsible for the receiving, setup, and delivery of new computers.
   b. ITR will develop timelines based on known funding and support timetables to assist in deciding when new computers will be ordered. (As an example no new computer installations will be performed between August 15th and September 15th to deal with the tremendous volume of support required at the beginning of each semester.)
8.0 Personnel and Organizational Plan

Current Environment
Information Technology Resources (ITR) currently consists of five divisions:

Academic Computing
• provides technical support to faculty to help them incorporate technology into the learning environment
• supports the general purpose computer labs that are staffed with lab managers and/or student workers
• provides training focused on teaching faculty how to use new technologies in the classroom with the aim of enriching the teaching/learning experience
• coordinates campus technology security

Information Systems and Computer Services
• provides technical support principally for the administrative functions of the university such as Student Records, Financial Records, Payroll, Personnel, etc.

Radio and TV Communication Services
• manages radio and TV production
• operates RU cable Channel 9
• operates WVRU (89.9 MHZ) FM radio station
• manages satellite receiving equipment
• Assists with the design and support of distance learning and multimedia facilities

Systems Administration and Computer Operations
• staffed 24 hours per day, five days per week to monitor campus computers and network devices
• manages virtually all the computers and servers on campus; maximizes system performance; loads and configures new software releases
• responsible for a major aspect of information technology security
• handles data backups for most campus computers and servers
• prints and distributes reports
• maintains hardware and software contractual records
• scans and scores optical mark exams

Technology Assistance Center
• manages Computer Help Desk which diagnoses and resolves technical problems affecting information technology products, and sets up and installs new computers
• manages Systems Integration activities which functions much like a Help Desk for RU’s IFAS Financial Accounting System
• assists with procurement of all information technology products to ensure value and consistency with campus standards
• responsible for a major aspect of security pertaining to the administrative systems
• provides training designed to enhance the general technological competencies of the university community
• manages Electronic and Computer Repair Services which repairs electronic equipment and installs upgrades

In addition to the ITR staff, significant technology support comes from personnel in Network Services, a part of the Facilities Management organization; as well as from employees in the various colleges and the library, part of the Academic Affairs Division.

Critical Issues
1. How can leadership, coordination and support be best provided for Academic Computing? Related to this is the issue, What should be the roles and interrelationships among the staff in ITR and the technology staff in Academic Affairs units? While the goal of providing effective instructional technology is one of the major goals of our University's Strategic Plan, the current organization of ITR has no position responsible for leadership and coordination in this critical area. Currently many of these responsibilities are divided among ITR staff, technology staff in the colleges, and technology staff in the library. It is essential that the roles and interrelationships of these personnel be better defined and coordinated.

2. How can distance learning initiatives be better supported? While this is somewhat related to the first critical issue regarding Academic Computing, distance learning is such a major component of our academic delivery and Strategic Plan that it needs particular attention.

3. How can better technical support be provided for all aspects of technology at Radford? This was the major critical issue related to personnel and organization identified across all aspects of our strategic planning for technology.

4. How can web-based technology be better supported? There is little question that web-based technology is and will continue to be an increasingly important component of all aspects of technology applications -- instructional, administrative, service, and public relations. However the current personnel and organization for technology provides little support or coordination for this critical function.

5. What are the roles and interrelationships among ITR Radio and TV Communication Services, Public Relations, Student Media, and academic programs regarding broadcast media services? This is another area in which the roles and interrelationships are not currently well-defined.

6. How can network security and information security be better ensured? Although security is partially addressed by current personnel responsibilities, this is a broad and critical area which needs more attention.
Strategic Goals and Actions

1. The organization of ITR and the relationships between the ITR staff and the technology staff in academic units will provide for the identity, leadership, coordination, and support needed for Academic Computing.
   a. A position of Director of Academic Computing will be created with responsibilities for providing the leadership and coordination of academic computing functions.
   b. Technology positions within academic units will be responsible to both the unit supervisor and to the Director of Academic Computing to assure better coordination between centralized and distributed staffing.
   c. Each college and the library will have a technology committee to establish goals and prioritize needs within that unit, connected to the University's Strategic Plan for Technology; the membership of this committee will include the ITR Committee representative from each college and from the library.
   d. Planning and operational decisions affecting academic programs, personnel and facilities will be coordinated by the Director of Academic Computing with the Deans, with regular reporting to the Vice President for Business Affairs and the Vice President for Academic Affairs.

2. Distance Learning initiatives and the functions needed to support them will be coordinated between ITR staff and Academic Affairs.
   a. A position with full-time responsibility for the administration and programming of distance learning will be created in Academic Affairs.
   b. ITR staff will continue to provide the technical support needed for distance learning.

3. Technical support for all areas of technology will be improved.
   a. ITR will identify where additional staffing is needed and what types of staffing are needed to provide effective technical support. Related to this, the ways that students are used needs to be evaluated.
   b. Additional opportunities for training for faculty and staff in all areas will be provided as outlined in section 6.0 of this plan. Such training will include classes, workshops, peer support and documentation available to users for all university supported applications.
   c. The ITR HelpDesk will focus on trouble-shooting equipment and software problems. A voice-response system for handling incoming calls to the HelpDesk should be considered. The development of a web-based guide providing answers to frequently asked questions should also be considered.
   d. Better integration of the HelpDesk and Machine Repair will be provided to create more efficient support for users whenever equipment repair is needed.

4. Greater support for web-based communication and development will be provided.
   a. The roles and responsibilities needed to provide and manage web-based applications for academic, administrative, communication, and public relations functions will be identified and assigned.
   b. A position will be created with responsibilities for providing advanced technical support for web applications.
5. Greater coordination of roles and responsibilities regarding broadcast media, including radio, television, and web-casting, will be provided.
   a. The roles and responsibilities needed for broadcast media functions will be identified and assigned.
   b. Policies related to all uses of broadcast media will be developed during the 1999-2000 academic year.

6. Network and information security will be improved.
   a. A formal network and information security plan will be developed.
   b. Responsibilities for network and information security will be assigned to ITR staff and to the Networking staff.
   c. The creation of a network security officer position will be evaluated.
9.0 Funding Plan

Current Environment
Technology related expenditures are currently funded from a number of sources including:

1. **Information Technology Resources Operating Budgets**-- This includes the regular operating budgets of all units of the ITR organization, as well as Network Services.
2. **Student Fees**--
   - **Student Technology Fee**-- This fee is enrollment dependent and has only been approved for the 1998-99 & 1999-2000 academic years. Additional years may be approved by the State. These funds must be used for the technology expenditures that directly benefit students and include items such as hardware, software, student worker positions and 1500 hour wage positions (no full-time).
   - **Computer and Network Fee** – This fee is also enrollment dependent and can be expected to continue as a budget source for technology expenditures. Funds are used primarily for student computer labs and networking.
3. **Division Budgets** -- Divisions and the individual units under them typically spend a significant portion of their discretionary funds on technology items. University Divisions include Academic Affairs, Business Affairs, Student Affairs, University Advancement, and the President's Office.
4. **State of Virginia Equipment Trust Fund** – These funds are a primary source of equipment purchases at Radford University. However, these funds cannot be used for equipment with a useful life of less than three years, general application software, equipment costing less than $500, or used equipment.
5. **External Funding** -- Some external funds, primarily in the form of grants and donations to the Radford University Foundation are available for technology purchases.

Critical Issues
1. How can Radford University develop and implement a coordinated funding plan for technology given the large number of different budget sources, rules for their use, and controlling entities involved?

2. It is generally accepted that technology will continue to play an increasingly important role in higher education. What should the University do to identify and secure increased funding for technology?

3. The cost of training, software, and support are frequently forgotten or ignored when decisions to purchase computers and related equipment are made. What can the University do to ensure that training and support costs become factors in all technology purchase decisions?

4. Most computer and related equipment has a limited life cycle and will need to be replaced on a recurring basis. Failure to budget for these future costs leads to budget shortfalls and/or outdated facilities. What should the University do to ensure that these costs are considered
and planned for when decisions to invest in new technologies or expand existing ones are made?

5. Large, unplanned, technology purchases frequently cause major problems in the regular processes for equipment acquisition and deployment. How can the University develop and implement a "programmed" approach to acquisition and handling of technology equipment from funds that are not centrally controlled by ITR staff, especially late in the budget cycle?

6. The cost of software is frequently ignored when decisions to purchase computers and related equipment are made, often times because some funding sources can be used to purchase hardware but not software. What can the University do to ensure that the cost of software is planned for when new computing equipment is invested in?

7. Seldom used equipment and facilities become obsolete just as rapidly as frequently used ones. How can the University encourage the sharing of technologies in order to best use the funds that are available? Are there other ways that the University could reduce the cost of providing technologies to faculty, students, and staff?

**Strategic Goals and Action Plans**

1. The University will take the following steps to improve budget coordination:
   a. All entities responsible for central technology funding sources should conduct joint planning meetings to ensure that
      • all technology needs are met by careful assignment of costs to funding sources that allow such costs.
      • items are not lost in the cracks between budgets
   b. The central ITR staff will increase its advisory role to those controlling departmental and other decentralized budgets through publication of standards, recommendations, and strategic objectives.
   c. All sources of technology funds listed under Current Environment and their proposed uses will be reviewed by the ITR Committee to improve its ability to make recommendations regarding the use of funds.

2. The University will actively pursue increased funding in the area of technology by lobbying for:
   a. continuance of the student technology fee.
   b. continuance of the increased ETF fee that resulted from the Virginia Technology Initiative.
   c. increased line items for equipment and software for individual departments.
   d. increased operating budgets for ITR to meet identified staffing needs (see section 8.0 -- personnel and organization plan).

3. The University will develop multi-year budget plans for major recurring technology costs.
a. ITR will develop two to four year replacement cost plans for computer labs, multi-media classrooms, and other major facilities.
b. Each division will develop two to four year replacement cost plans for computer workstations.
c. Tentative funding sources should be identified for all recurring costs identified in items "3.a." and "3.b." at the joint planning meeting recommended in "1.a."

4. The University will take the following steps to better manage year-end purchases of technology by individual departments:
   a. require, by January 31st of each academic year, the submission of tentative plans for technology acquisitions from funds that may be available at year-end.
   b. develop a review and feedback process for those plans so that appropriate, standard, and non-redundant technologies are purchased.
   c. encourage dialogue between individual units and central ITR staff with regard to departmental level technology acquisitions.

5. The University will establish policies that link equipment purchases and support costs. Possibilities include:
   a. Communicating the dollar costs associated with acquisition, deployment, and support of equipment that is purchased so that individual units are aware of the additional costs the University must bear when technologies are purchased.
   b. Communicating the impact of technology purchases on other infrastructure items such as space, power, air conditioning, networking and furniture.
   c. More realistic central budgeting for support costs given the anticipated spending on technology.

6. Policies will be established to link software and hardware costs.
   a. Require the name, initial cost, expected annual upgrade costs, and anticipated funding sources for software at the time requests are made for computer hardware.

7. Cross unit sharing of technologies and other methods of cost reduction will continue to be encouraged through policy, recommendations, and example.
   a. the commitment toward University coordinated planning and control of computer labs should be continued.
   b. facilities usage should be measured to determine where underutilized facilities exist.
   c. more effective and efficient scheduling of existing facilities should be encouraged and supported.
   d. the recommendation by the acquisition workgroup to adopt hardware and software standards should be accepted
   e. Divisions and their respective sub-units must be asked to prioritize and communicate technology needs to other units as well as central IT planners to facilitate the coordination of purchases of similar hardware and software and to help drive central ITR budgets.
**Glossary**

**Alumni/Development Module (XRM):** Internal software module used to record and store alumni information (e.g., name, address, employer, donors, prospects).

**Analog telephone lines:** Standard telephone service that most homes use, typically restricted to about 52 Kb/s (52,000 bits per second).

**ATM:** (Asynchronous Transfer Mode) A scalable high-speed network architecture that organizes data into small “cells”. These “cells” can be used to transfer data, video, or voice.

**Automated Fuel System:** Computerized system used by Facilities Management to track university vehicle fuel usage.

**Backbone Switch:** A high speed networking device that makes up the core or center of a large network or Intranet.

**Benefits Eligibility System (BES):** State of Virginia’s external tracking software system used to maintain employee benefits transactions (e.g., medical insurance).

**Building Automation System:** Internal system used to control building operations, e.g., energy management system.

**CATV:** An acronym for Community Antenna Television, it refers to TV programming distribution for broadcast signals by means of coaxial cable or fiber-optic cable.

**Centrex telephone service:** A business telephone service provided by a local telephone company to a business, university, or other organization providing a range of phone numbers and centralized services within the organization.

**Commonwealth Accounting and Reporting System (CARS):** State of Virginia’s external financial accounting software system used by RU financial offices. Internal financial transactions in IFAS must be transmitted and maintained in CARS.

**Commonwealth Integrated Payroll/Personnel System (CIPPS):** State of Virginia’s external payroll software system used by RU Payroll Office to issue employee paychecks and related tax forms.

**Contention factor:** The amount of time that two or more computers or devices compete for the same resources. In networks, this refers to the time that two or more workstations attempt to transmit a message across the same wire at the same time.

**Data imaging software:** Software that captures paper records and stores them on a computer storage medium.

**Data warehouse:** A large server that stores many different databases for an entire enterprise.

**Demographics (BOX):** Internal software module used to record and store employee and student demographic data (e.g., name, local/permanent address).
**Diebold Card System:** Internal system used for student/employee identification cards and RU Express program.

**Dining Services Inventory/Management System (CBORD):** Internal software system used in Dining Services to plan meal menus, cost meals, order supplies, and maintain inventory.

**Dining Services/Facilities Management Time Card System:** Internal system used to record employee hours worked.

**Ethernet connection:** A dedicated connection to the Internet that operates at a very high rate of speed, typically 10 Mb/s (10,000,000 bits per second).

**Financial Aid (AID):** Internal software module used to record and store information relating to student financial aid.

**Firewall:** A collection of components placed between two networks in order to control network traffic and authorize defined network security policies. Firewalls are used to prevent unauthorized users from accessing private networks connected to the Internet. All messages entering or leaving the Intranet pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria.

**Gb/s:** (Gigabits per second) A data transfer measurement for high-speed computer networks such as Gigabit Ethernet, used to describe the data transfer rate; a gigabit equals 1,000,000,000 bits. (1000 Megabits per second.)

**Heth Information Office Facilities Scheduling:** Internal system used by the Information Office to reserve campus facilities.

**Housing (AFF):** Internal software module used to record and store information relating to residence hall student room assignments and meal plan selection.

**Hub:** A multi-port device on a computer network through which individual computer stations are physically connected.

**Human Resource Information System (HRIS):** Internal human resource (personnel) software system used as depository for employee demographic information.

**Interactive Fund Accounting System (IFAS):** Internal financial accounting software system used by campus departments. Modules include accounts payable, accounts receivable, ad-hoc report writer, fixed assets, general ledger, purchasing, stores inventory.

**Interactive video conferencing:** A two-way live audio and video communication link between two or more sites in which participants can see and hear each other.

**ISDN:** An acronym for Integrated Services Digital Network, it refers to a type of telephone service using digital signals (as opposed to conventional analog signals) commonly used to send and receive both voice and data packets. ISDN provides transfer rates of 128 Kb/s. (see "analog telephone lines")
**Kb/s:** (Kilobits per second) A data transfer measurement used to describe data transfer rates; a kilobit equals 1,000 bits.

**Mb/s:** (Megabits per second) A data transfer measurement for computer networks used to describe the data transfer rates; a megabit equals 1,000,000 bits.

**Metering software:** Software that allows a server to limit the number of copies of a given software package that can be accessed at any given moment. Software can be available from all computers but only a specified number of users can use the application at any given moment.

**Network router:** A device that controls where packets of data need to be sent. A router is responsible for choosing the best path to get information from the source computer to the destination computer. Routers also maintain performance by subnets to reduce the number of users on a given network segment.

**Non-interactive, web-based information:** Human resource and registration information, e.g., employment information, summer schedules, open classes.

**Parking Management System:** Internal software system used to maintain vehicle registration and parking ticket data.

**Personnel Management System (PMIS):** State of Virginia’s external personnel software system used to record and store employee demographic and employment data.

**Plug-ins:** A software program that adds a specific feature or service to a larger system. For example, plug-ins for Netscape and Internet Explore enable the display of different types of audio or video messages.

**Police Caller ID System:** Similar to 911 system; records location and person making calls to the campus Police Department. Also tracks and records information for state reporting requirements.

**Post Office Billing Program/Printing Costing Program:** Internal costing programs to track and report campus departmental charges generated from use of post office and printing services.

**Printing Lynx System:** Allows publications to be designed on the computer and transferred directly to negatives, eliminates darkroom time for the Printing Department (image maker).

**PROBUD/FATS:** External system which provides a means for state agencies to submit budget proposals and adjustments in the appropriation and allotment of funds to the Department of Planning and Budget.

**Registration Information Module (RIM):** Internal software module used to record and store student registration data (e.g., class registration/withdrawals, grades).

**Satellite receive/distribution system (SOS):** A cable television system consisting of a satellite dish that receives signals from television program providers and distributes the signals through a CATV system.

**Server:** A computer or network device that provides services to multiple users on the network. For example, a file server allows multiple networked computers to share one set of files, programs, or documents. A printer server allows multiple networked computers to access a network-attached printer.

**Single sign on (SSO) authentication:** SSO allows users to remember and use only one username and password pair for various services on a computer network such as network access, email access, and other
password protected services. A single server stores the username and password information and other network servers access this information when users request information.

**Shared hub:** When an Ethernet packet of information is transmitted to a shared hub by one computer station, it is repeated, or copied, over onto all of the other ports of the hub. In this way, all of the computers with ports on that hub "see" every packet from any computer connected to the hub. (see "hub" and "switched hub")

**Student Admissions Module (SAM):** Internal software module used to record and store student admissions information (e.g., inquiries, offers, acceptances).

**Switched hub:** When an Ethernet packet of information is transmitted to a switched hub by one computer station, it is transmitted only to the port for the intended computer station on the hub. (see "hub" and "switched hub")

**Telephone Billing System (TELESOFT):** Internal system used to maintain records and charges related to the campus telephone system and produce billing statements.

**USENet News:** USENet News is the world's largest bulletin board system. USENET has several thousand newsgroups for specific subjects of interests to users of the Internet. This system allows all users to read and post messages to any group. The groups have many purposes including technical discussions, current events, sports, hobbies, and cultural exchanges.

**Video Imaging ID System:** Internal system used in the RU Express office to generate identification cards with the person’s photo.

**Web authoring tools:** Software which makes it easier for individuals to create web pages and the links between them.

**Web based instruction:** The use of the web as the primary medium for providing instruction. (compare "web enhanced instruction")

**Web browser software:** Software which allows users to access, view, and navigate web sites. Netscape and Internet Explorer are common examples of web browser software.

**Web enhanced instruction:** The use of the web as a supplemental medium for providing instruction. (compare “web based instruction”)

**Work Order System:** Internal system used in Facilities Management to record and report work assignments for the campus and campus departments.
Participants in Developing the Strategic Plan for Technology

Coordinating Committee
Bob Phillips, Chair
Martin Aylesworth
Ray Kirby
Ed Oakes
Evelyn Wilson
Bill Yerrick

Work Groups

Student Competencies
David Hill, Chair
Warren Self, Resource person
Blair Brainard
Tom Cleary
Scott Flor
John Helm
Carl Lefko
Loretta Lemay
Bonnie Skelton
Krista Smith
Craig Waggaman

Technology-Based Instructional Methodologies
Mike Dumin, Chair
Carl Stockton, Resource person
Susan Bisset
Dennis Cogswell
Jeradi Cohen
Jay Flynn
John Fox
Barbara Foulks
Eugene Gourley
Bruce Mahin
Ted McKosky
Sharon Roger Hepburn
Parvinder Sethi
Bob Sheehy
Jonathan Tso
Martin Turnauer
Jim Unnever
Jolanta Wawrzycka
Linda Wilson
Susan Woodward
Wei-Chi Yang

Administrative and Ancillary Support
Hubert Barton, Chair
Jim Graham, Resource person
Evelyn Wilson, Resource person
Fletcher Carter
Jean Cox
Peggy Griffiths
Joan Hannah
Gwen Hughes
Todd Joyce
Frank Leighton
Tommy Manning
Beth Martin
Randa McDonald
Barbara Porter
Linda Reed
Lisa Ridpath
Tina Saunders
Penny White

Information and Communications Applications
Ed Oakes, Chair and Resource person
Sung-Chi Chu
Sean Ramsey
Rick Rogers
Ron Rojewski
Chris Smith
Jeff Willner
Technology Support Plan
Ed Oakes, Chair and Resource person
David Butcher
Donna Caldwell
Loretta Criner
Todd Joyce
Jennifer Spoon
Reggie Williams
Richard Worringham

Personnel and Organization Plan
Coordinating Committee

Funding Plan
Coordinating Committee