

Electronic Classroom Support Services Digital Dashboard

By

Phillip P. Edmondson

Submitted to the Faculty of the Information Engineering Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Engineering Technology

University of Cincinnati
College of Applied Science

May 2001

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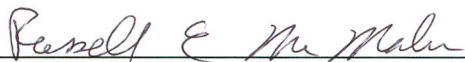
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Phillip P. Edmondson



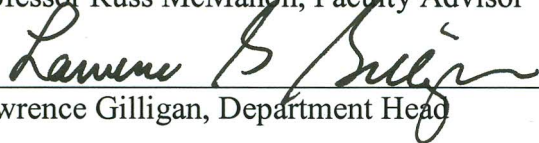
June 1, 2001



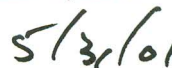
Professor Russ McMahon, Faculty Advisor



June 1, 2001



Lawrence Gilligan, Department Head



June 1, 2001

Acknowledgement

I would like to express gratitude to Jane Combs, Electronic Classroom Support Services, University of Cincinnati for assistance and support of department resources and time.

Dedication

"Computers are useless. They can only give you answers."

Pablo Picasso (1881-1973)

This project is dedicated to the Electronic Classroom Support Services department, University of Cincinnati. The department has shown great flexibility and support to me. I would also like to dedicate this project to my wife, Shiloh, for her invaluable patience and support of my career.

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Abstract

This document records the information that accompanies the conception, progress, procedures, recommendations, and conclusions of my senior design project. This report includes a statement of the perceived problem, a working IT solution to the problem, the design deliverables of the problem, the process for meeting these deliverables, the proof of authenticity for meeting the deliverables, and the conclusion with recommendations.

The Microsoft Corporation developed Digital Dashboard technology. With increasing amounts of information available to knowledge workers, efficient and flexible data management tools are essential to properly assess and act upon business opportunities. Digital Dashboards enable better knowledge management by consolidating personal, team, corporate, and external information and providing single-click access to analytical and collaborative tools—all in a single, familiar desktop view. This IT solution was built for the same idea for Electronic Classroom Support Services (ECSS), University of Cincinnati.

I assessed the needs of ECSS through applied research of the daily department functions and future goals. In my research, I found that ECSS lacked organization of its electronic resources and lacked strong communication fundamentals. I built the ECSS Digital Dashboard by building a web-based portal (Digital Dashboard) that uses web components built using Digital Dashboard technology, and programming and multimedia skills learned in my degree program. I incorporated web components that delivered a creative interface, bringing ECSS's electronic resources and communication tools to the front thus meeting objectives of the solution.

The application is built interactively for ECSS department members, and requires basic Windows interface knowledge. Advanced and sophisticated web components allow users to bring daily-used department applications to a single interface, work collaboratively on projects and tasks with department members, and communicate with other department members by single click speed.

The completed ECSS Digital Dashboard meets all objectives discussed in prior senior design classes, and brings a working, interactive IT solution that uses state-of-the-art technology to the ECSS department.

Electronic Classroom Support Services Digital Dashboard

1. Problem: Unorganized Electronic Resources within ECSS

According to the responses from staff in the UC Office of Information Technologies (UCit) organizational survey, two negative aspects of UCit's current organizational culture/environment are insufficient communication, and that the department is reactive rather than proactive in its approach to its services. UCit provides central computing and communications services to and planning, policy and architectural support for the University community. Electronic Classroom Support Services (ECSS) is a department within UCit. ECSS is broken into four main categories: Administration, Hardware Support, Computer Support, and Electronic Classroom Support. Jane Combs, Manager of ECSS, has tasked ECSS department personnel with resolving these problems.

There are also several other problems that need to be addressed. Currently, ECSS does not record or store software/hardware information in shared, accessible format. Project management and passing along information from staff meetings does not exist. If a department member misses a staff meeting or a meeting about a future project or mission, the notes and discussions from that meeting are not passed along in a format that users can view at any time. The resources and applications used by ECSS are spread wide in the department. Applications are stored in multiple folders and networked drives. Users spend time searching for applications because of this. The department does not use task, project, and classroom scheduling to arrange personnel, and duplicates assignments and jobs because of disorganization and lack of communication. The ECSS Intranet is not current, information is not readily accessible, current, or visible, and communication between superiors, co-workers, and faculty is inefficient. Workers can sometimes be

overloaded with information, which causes work not to be prioritized and sometimes lost. Users cannot access information in a user-friendly, interactive format. Video-conferencing, communication access, and support of faculty, students, and network users is very important to ECSS and the University of Cincinnati. Most importantly the department does not have an interactive, web-based department portal to provide access to all of its needs.

1.1 Significance of Problem

According to data and information collected from research and interviews with my supervisor, Jane Combs, this problem is significant because the department is unable to fully complete its duties due to:

- A lack of communication
- Disorganization
- Resources at hand
- The inability to work with current, visible information to insure non-duplication of work.

2.0 Proposed IT Solution

To achieve the mission of ECSS, and provide solutions to UCit's organizational survey, supervisor Jane Combs needs an interactive, web-based department portal that:

- Consolidates software/hardware information
- Employee, faculty, and appointment scheduling
- Delegated tasks and jobs
- Future department project information

- Ultimately provides a better communication tool for the department to work more efficiently.

This interactive portal would be an interface that provides:

- Anytime access to department databases, the ECSS Intranet, the Internet, and ALL department resources
- Having the ability to communicate by electronic mail or streaming video at single-click speed.

Specifically, users need an application that can be used to view daily activities, share and prioritize information with co-workers and supervisors, and receive feedback on performance and assignments.

A specific IT solution to this problem is a Digital Dashboard. The Digital Dashboard will bring an integrated view of ECSS's resources to any users desktop, enabling better decision-making, communication, and organization. A Digital Dashboard is a well-structured web-based portal that can help a company's employees find, create, and share mission-critical data. Microsoft defines a Digital Dashboard as a "customized solution that consolidates personal, team, corporate, and external information and provides single-click access to analytical and collaborative tools. It brings an integrated view of a company's diverse sources of knowledge to an individual's desktop, enabling better decision-making by providing immediate access to key business information."

Microsoft built Digital Dashboard technology because "many workers had a difficult time finding crucial, up-to-date information about their industries, their companies, and even their workgroups. Today, that situation is changing in many organizations as

employees gain unprecedented access to data from a range of sources: Web sites, Intranets, news services, e-mail, documentation, and corporate databases.”

Honeywell is one of the world's leading providers of control technologies for buildings, homes, industry, space, and aviation. Honeywell's advanced monitoring and control systems generate detailed information about industrial processes at its customers' manufacturing plants. To support effective and timely decision-making, Honeywell is building digital dashboards based on Microsoft technologies that will bring real-time data from these systems to workers at every level in its customers' organizations, from process engineers to plant managers and top executives. The flexible digital dashboard technology will enable users to choose the information to display based on their job functions and individual needs. With a comprehensive view of critical, task-relevant data, Honeywell customers will be empowered to make timely, intelligent decisions that increase profits and reduce costs. This model parallels the technology and ideas that I incorporated into my Digital Dashboard.

This is an appropriate senior capstone IT solution because it incorporates multiple applications learned in the Information Engineering Technology (IET) degree program. The four pillars of the IET degree program: programming, databases, multimedia productions, and networking will be implemented into this project. Specifically, Microsoft 2000 Server, IIS, NTFS, Microsoft Office 2000, Microsoft Exchange Server, Microsoft SQL Server, ASP, XML, and Visual Interdev will be incorporated.

This project consists of two parts: 1) building the application, and 2) implementing the application into Microsoft Server 2000. This project will incorporate programming (XML, Visual Interdev), databases (ASP, SQL Server), networking

(Microsoft Server, IIS, and NTFS) and multimedia (overall interactivity). This solution works for ECSS because of its organization and interactive format, which will enable the department to function more efficiently.

2.1 Description of Solution

I began the project by downloading the Digital Dashboard Resource Kit from Microsoft. The application required that Microsoft Windows 2000 Server be the host operating system with an NTFS file structure. I then spent time learning and installing Internet Services Manager (IIS) and Microsoft SQL Server. IIS is used as the web server that has access to a SQL Server 2000 database in which to store dashboard and web part definitions. I also used Microsoft FrontPage and Visual Interdev to create the web components for the Digital Dashboard.

The solution that I have created for my Senior Design capstone project is a Digital Dashboard for ECSS. The Digital Dashboard incorporates web components built using Microsoft FrontPage and Visual Interdev. Once the web components or web parts were built, I used incorporated them into the Digital Dashboard through the Content tab. The Content tab is located at the top, right on every page and gives users the ability to add, delete, or create their own web parts. I decided what web components to build by researching and prioritizing what department resources were used most, and by surveying department personnel.

The heading links on the Digital Dashboard are: *ECSS Home*, *Project/Data Info*, *Communications Page*, *Computer Support Page*, *ECSS Data Info Page*, *eclassrooms*, *Technical Resources*, and *Help*. **Figure 1.** Shows the *ECSS Home* Page for the ECSS Digital Dashboard.

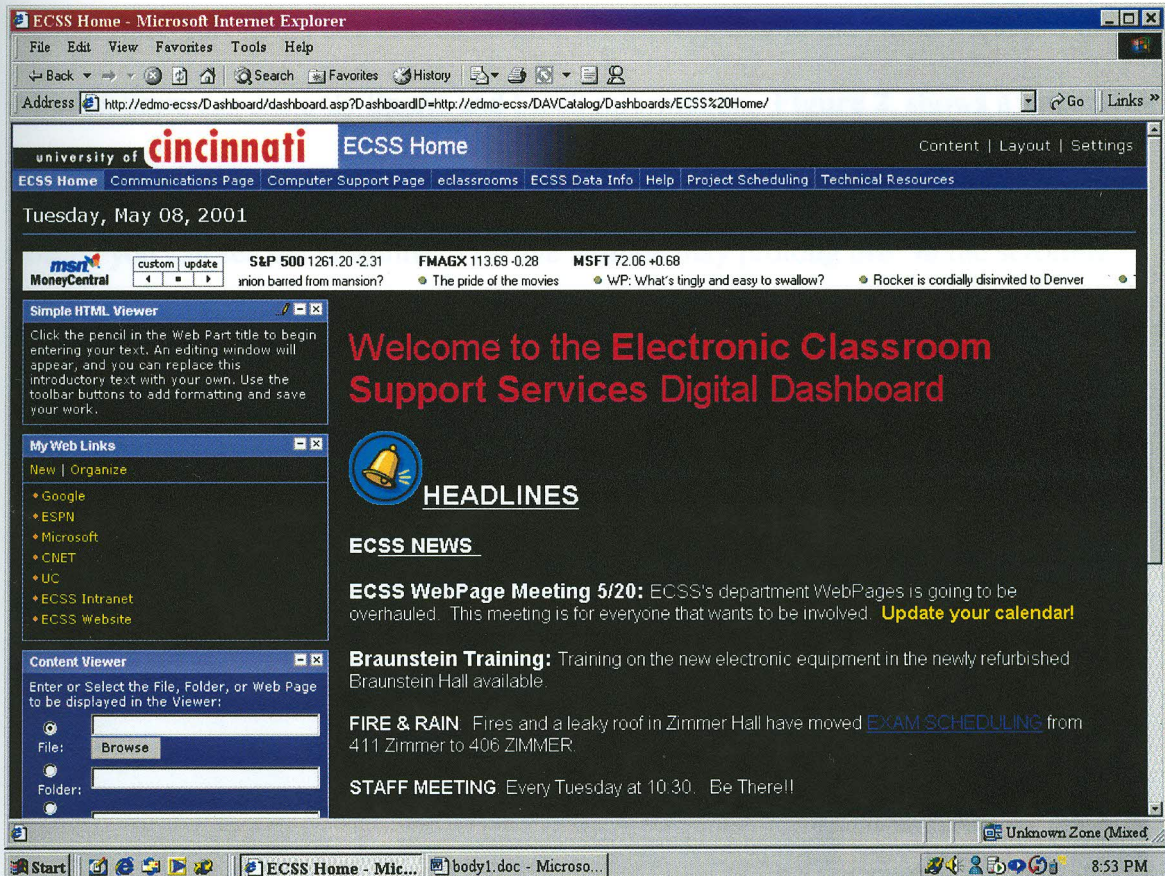


Figure 1. Home Page for ECSS Digital Dashboard.

The *ECSS Home* Page of the Digital Dashboard consists of the MSN News/Stock Ticker, a link to the ECSS department Intranet, an Intro/Welcome (bulletin board format) to the ECSS Digital Dashboard screen, a My Web Links web component, a Content Viewer, and an HTML viewer. The Content Viewer allows users to import any file or folder created using Office into the Digital Dashboard. For example, if ECSS users wanted a spreadsheet containing information about Zimmer Hall IP addresses in the

Digital Dashboard, users can browse to the file and import it to the Digital Dashboard. The News Ticker is a web component supplied by Microsoft and is customizable by the user. For example, users can view which type of news they wish to view. Users can click on any of the text scrolling in the ticker and a new browser window will open in Internet Explorer. Users can also customize the information in the News Ticker. For instance, users can see only Sports and Stock information. **Figure 2.** shows a screenshot of a new window opened by clicking on scrolling text in the News Ticker. If you look closely, you can see the Headline “Positive attitude may prolong life” in the scrolling News Ticker.

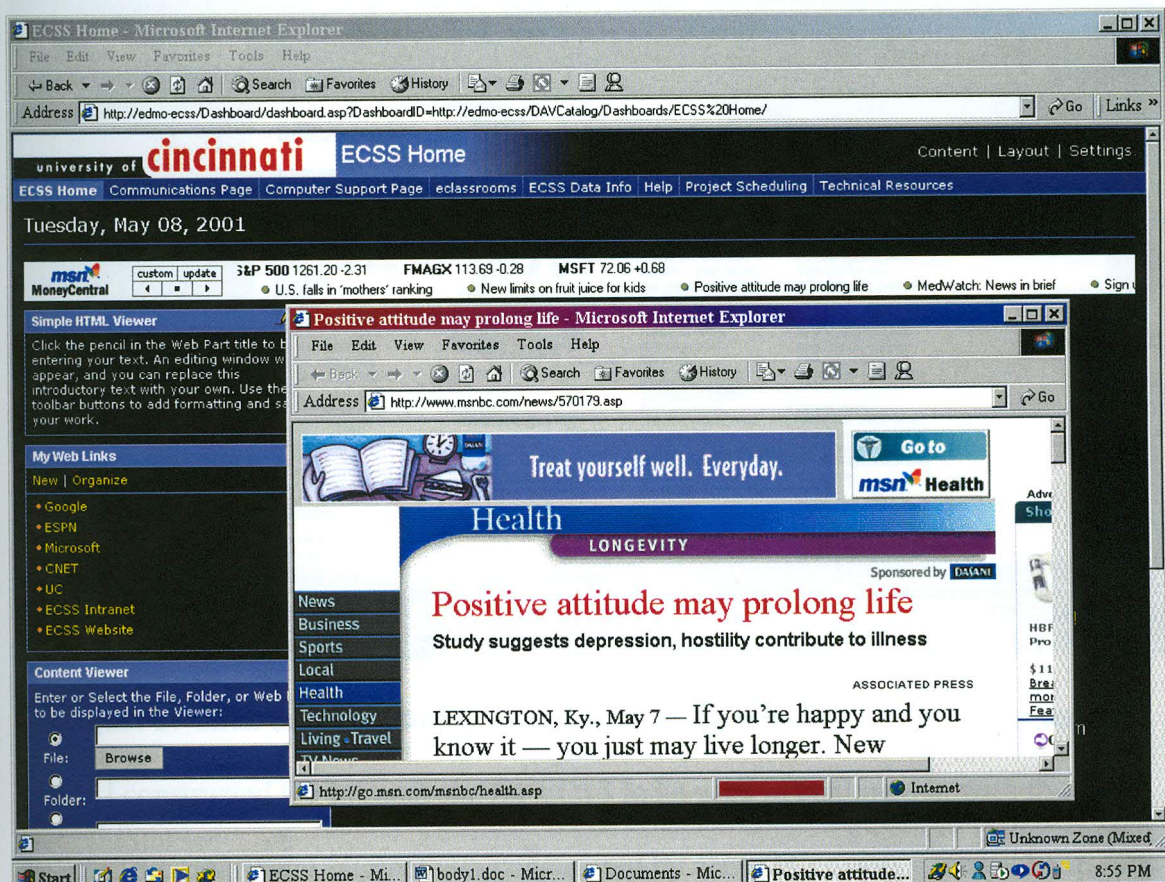


Figure 2. Clicking on text from the News Ticker will open a new browser window.

The web component titled “My Web Links” provides users a forum to host their favorite or most used web sites. Users can add or delete web sites from the web component. I have put Web sites such as Microsoft, Google, the ECSS Web site, and the department Intranet into the My Web Links web component. **Figure 3.** shows a new browser window opened in Internet Explorer from clicking a web link in the My Web Links section.

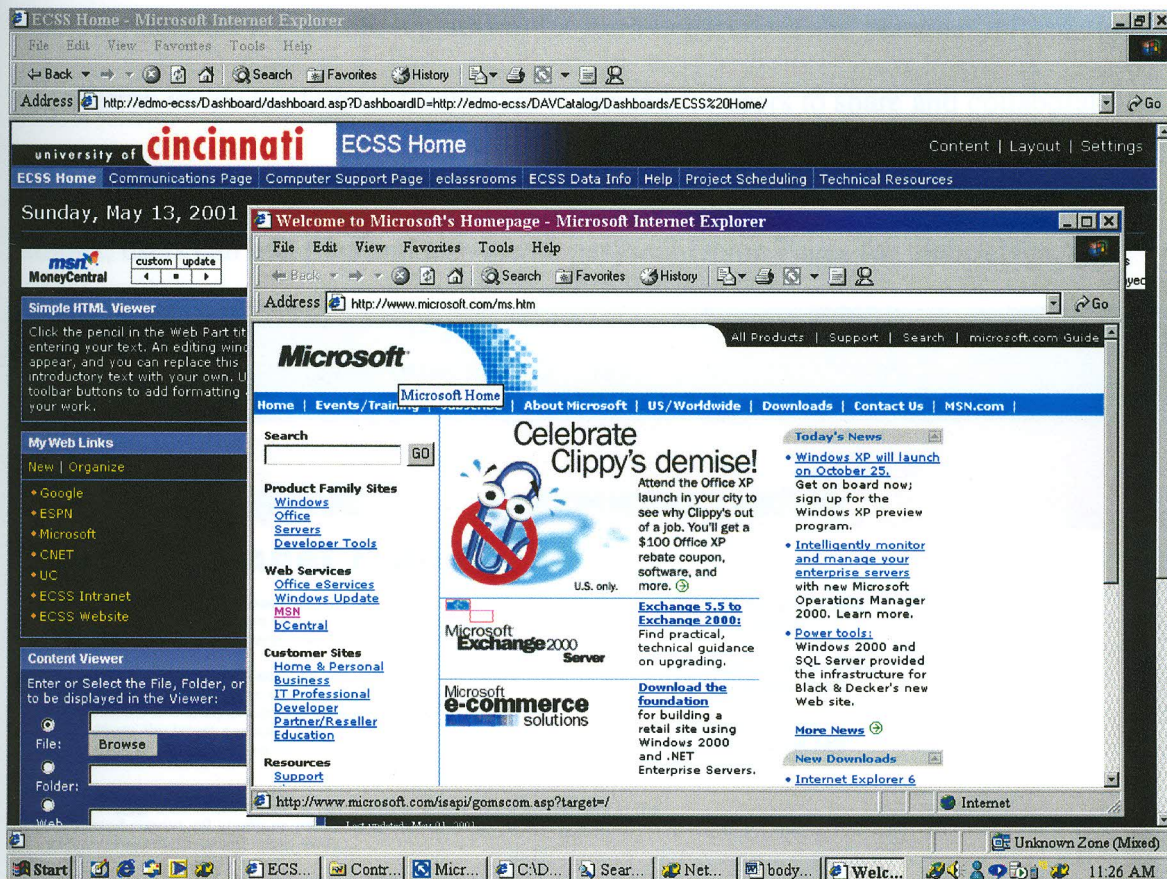


Figure 3. Click on a link in My Web Links and a new browser window opens.

I constructed the Intranet site for ECSS to be used in conjunction with this project. The department Intranet was constructed by using Microsoft’s Intranet Kit. The Intranet hosts information such as department news, and stored and shared department documents/information. For instance under the “Documents” page in the Intranet, users

are able to store more Microsoft Office files or folders, such as Excel spreadsheets and Word documents, under their user-name or a pre-defined public/private folder. I developed the user-named folders while developing the Intranet and made it possible for users to add their own documents or create their own private folders. Users of the Intranet can also search the Intranet for documents and information by accessing the “Search” tool. **Figure 4.** shows a screenshot of the department Intranet. The Intranet is necessary because it provides a platform for intra-department and personal information. Information inside the Digital Dashboard is created for users to share and collaborate, while the department Intranet provides both a private and shared environment. In the Intranet, users can add files and also create personal Home Pages for themselves.

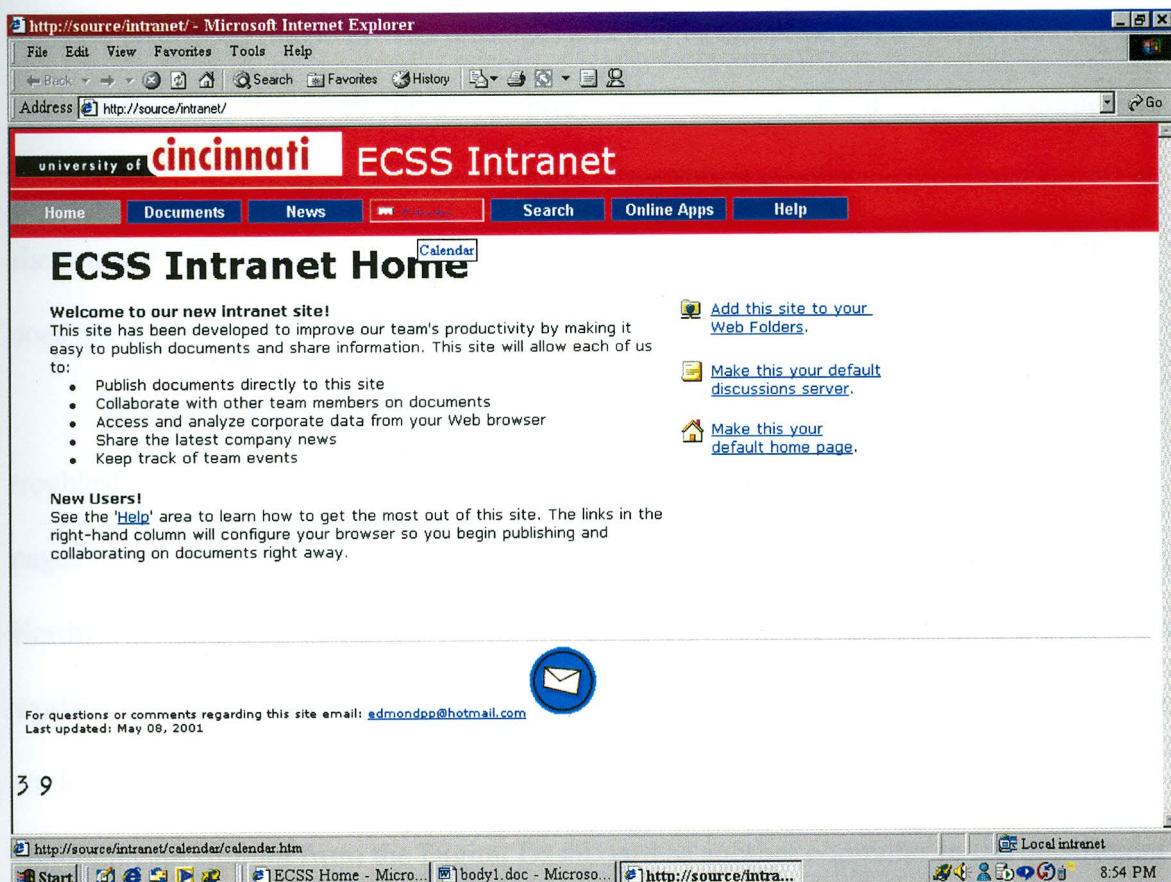


Figure 4. ECSS Intranet.

The “Welcome to the ECSS Digital Dashboard” .html page was constructed to act as an introduction to users of the Digital Dashboard, and provide a template to provide important ECSS department news to users. The current page introduces users to the Digital Dashboard and provides upcoming events and information. With department personnel constantly moving, this is a perfect place to display upcoming department news and information.

The *Communications Page* serves as an interface that allows users to conduct instant videoconferencing, file transfers, desktop sharing, and chat applications. I constructed the pages by using the Microsoft NetMeeting Developers Kit, available by download. I built these pages with the thought that users need to communicate by multiple protocols. I also provided images and text to make the pages more interactive and user friendly. With web cameras in place, users can have a real-time videoconference over the Microsoft Internet protocol TCP/IP. If an ECSS worker becomes mobile, he or she can still communicate via NetMeeting by dialing in to the TCP/IP address. ECSS does not currently, but will within the year, have web cameras in place for users.

NetMeeting is the application that the Computer Support department uses to troubleshoot network machines by using the desktop sharing protocol. There are four pages in the *Communications Page*. Three of the pages provide direct access to the Hardware Engineer, Department Head, and Computer Support. The remaining page is for workers to dial directly to any computer in the ECSS domain. Sample TCP/IP addresses are located on all pages for security reasons. From the *Communication Page*, users can communicate straight from the Digital Dashboard to another computer in the department or in a classroom. Users simply type the TCP/IP address into the text box under the

persons picture and press the button with a picture of a phone. The host computer will dial the TCP/IP address and ask for domain/computer authentication. Once the computer or person on the other end “answers” the response, users can take part in a real-time web meeting. This works for ECSS because it gives department workers another environment to communicate and collaborate on work. **Figure 5.** shows an example of the “Communicate with Hardware Engineer Page” through NetMeeting.

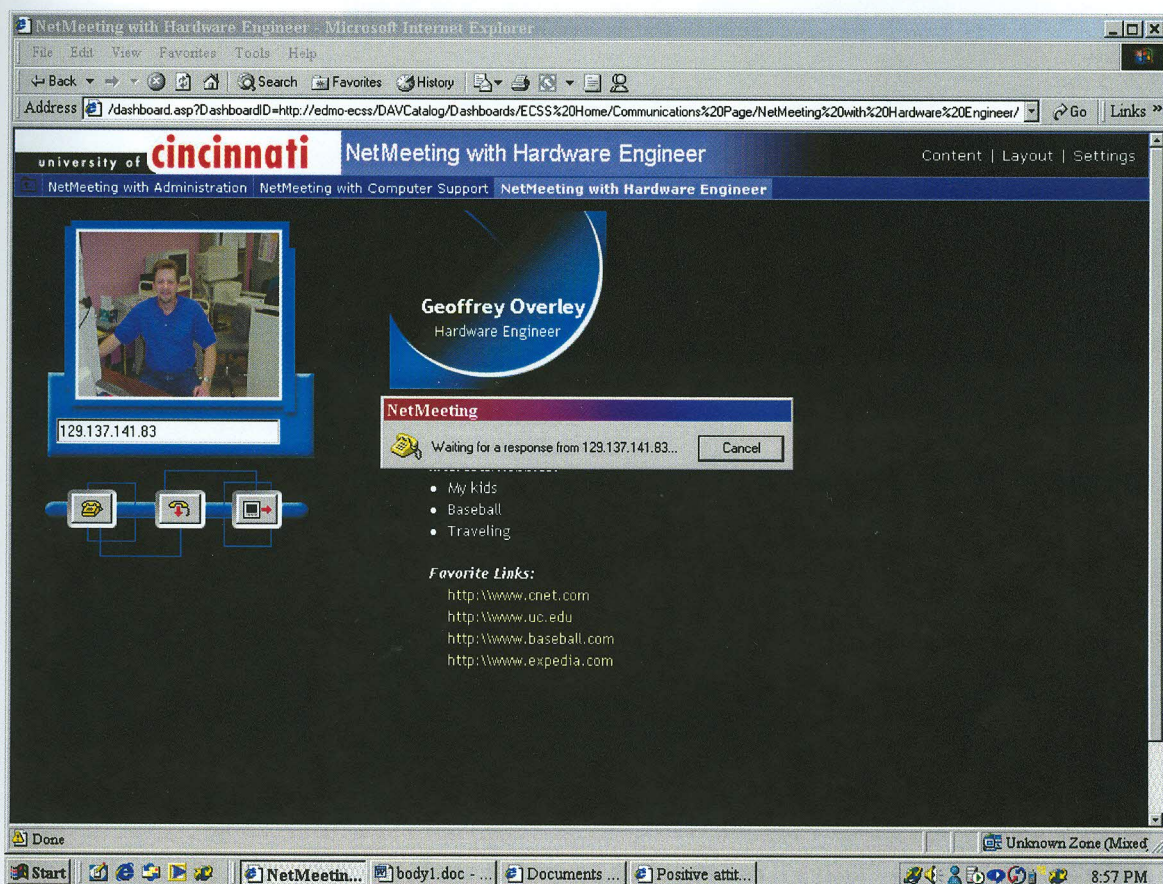


Figure 5. Communicate with Hardware Engineer Page.

Users can also unlock the NetMeeting application to add more features such as chat and file transfer. Users simply press the button with a computer and a RED arrow (pointing to the right) to unlock the NetMeeting application. **Figure 6.** shows an example of the NetMeeting application unlocked.

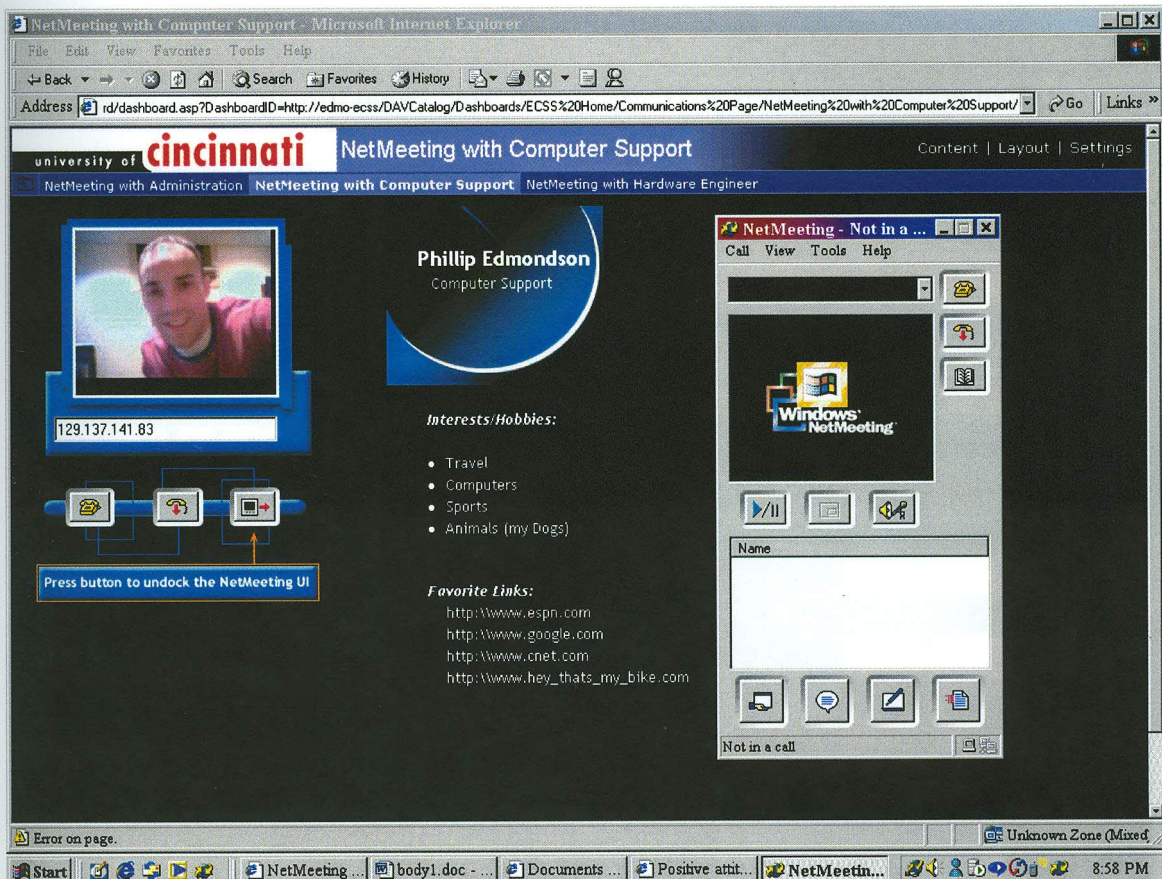


Figure 6. NetMeeting unlocked, ready for a “web meeting.”

The *Computer Support Page* serves as an interface for users to communicate via MSN’s Instant Messaging application. The Microsoft Instant Messaging Service Component (IMSC) is implemented as an ActiveX DLL and utilizes the Microsoft XML 3.0 SDK and the MSN Messenger SDK 1.0. To use the IMSC, the MSXML 3.0 Parser and MSN Messenger 3.5 were installed on the host computer where the component was to be used. The toolbox contains an IM Service that works with both MSN Messenger

and Exchange Instant Messenger to return the online/offline status of people. Using this information, you can IM enable many scenarios like team members online or document authors online. Users are able to participate in chat sessions directly from the dashboard via persons added to the “Contact List.” Users do not have to open or close any applications to enable Instant Messenger. This page along with the *Communications Page*, are two examples of how I have incorporated better communication tools to enhance and help ECSS. **Figure 7.** Shows the Computer Support Page with Instant Messaging capabilities.

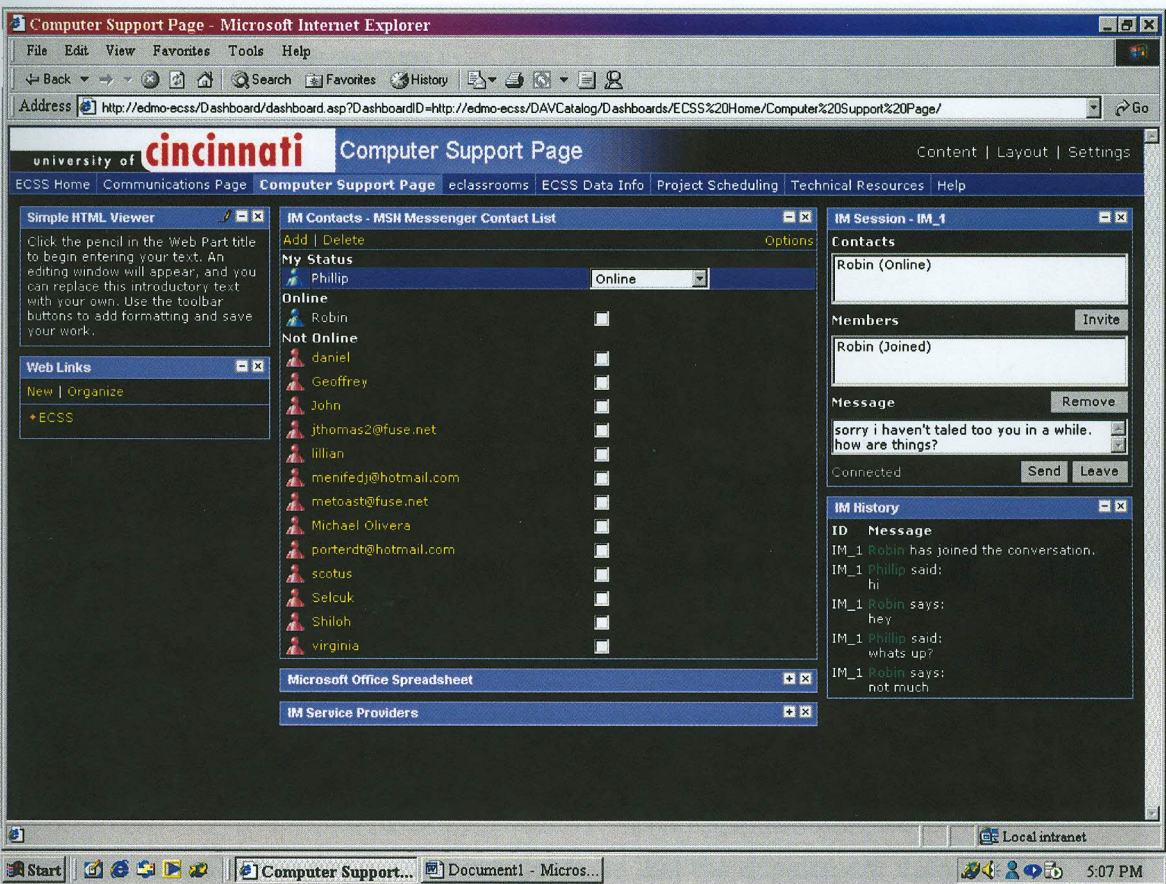


Figure 7. Computer Support Page, with Instant Messaging capabilities.

The *eclassroom* page serves as an application that provides ECSS workers with data about ECSS’ electronic classrooms. By clicking on the links in the *eclassrooms*

page, workers can find the classroom size, the hardware and software equipment in the room. The application is specific to ECSS classrooms. All pages open in new browser windows so to insure that the user does not become confused or lost from the Digital Dashboard. **Figure 8.** shows the *eclassrooms* page in the Digital Dashboard.

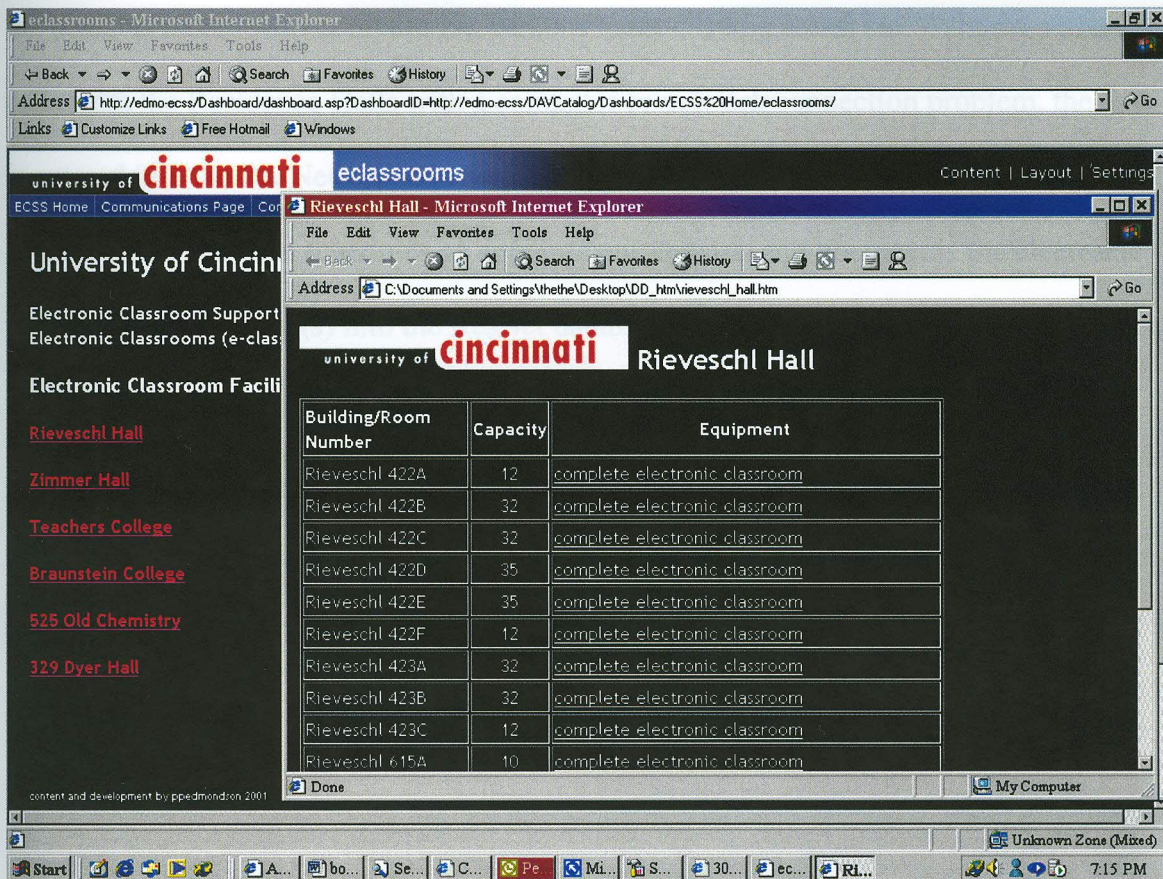


Figure 8. eclassrooms page of Digital Dashboard.

The *ECSS Data Info* page has two web components on it. The two web components are the ResNet database application and SQL Server based data information templates. The ResNet application is a database that the department uses for the University Residence Hall program. University of Cincinnati policy, in accordance and agreement with ECSS, provides Internet access to all persons living in the University Residence Halls. The University provides Internet capabilities to all persons and it is the

responsibility of ECSS to install and configure Network Interface Cards (NIC) and communication protocols. ECSS is also responsible for troubleshooting, and maintaining Internet access (with support from UCit) for all persons. Therefore, a database (Microsoft Access based) hosts a trouble call catalog that contains information such as, the actual problem with computer(s), persons names, living areas, etc. When a person calls from the Residence Halls with a computer or network connection problem, the data is entered into the ResNet application. ECSS queries the database daily for dates, names, and problems and then schedules an appointment, repairs, and documents the electronic or hardware deficiency(s) into the ResNet database.

This is an application that is used multiple times throughout the day. I did not build the application, it was already in place. I incorporated the application into the Digital Dashboard for accessibility. **Figure 9.** Shows the ResNet application in the Digital Dashboard.

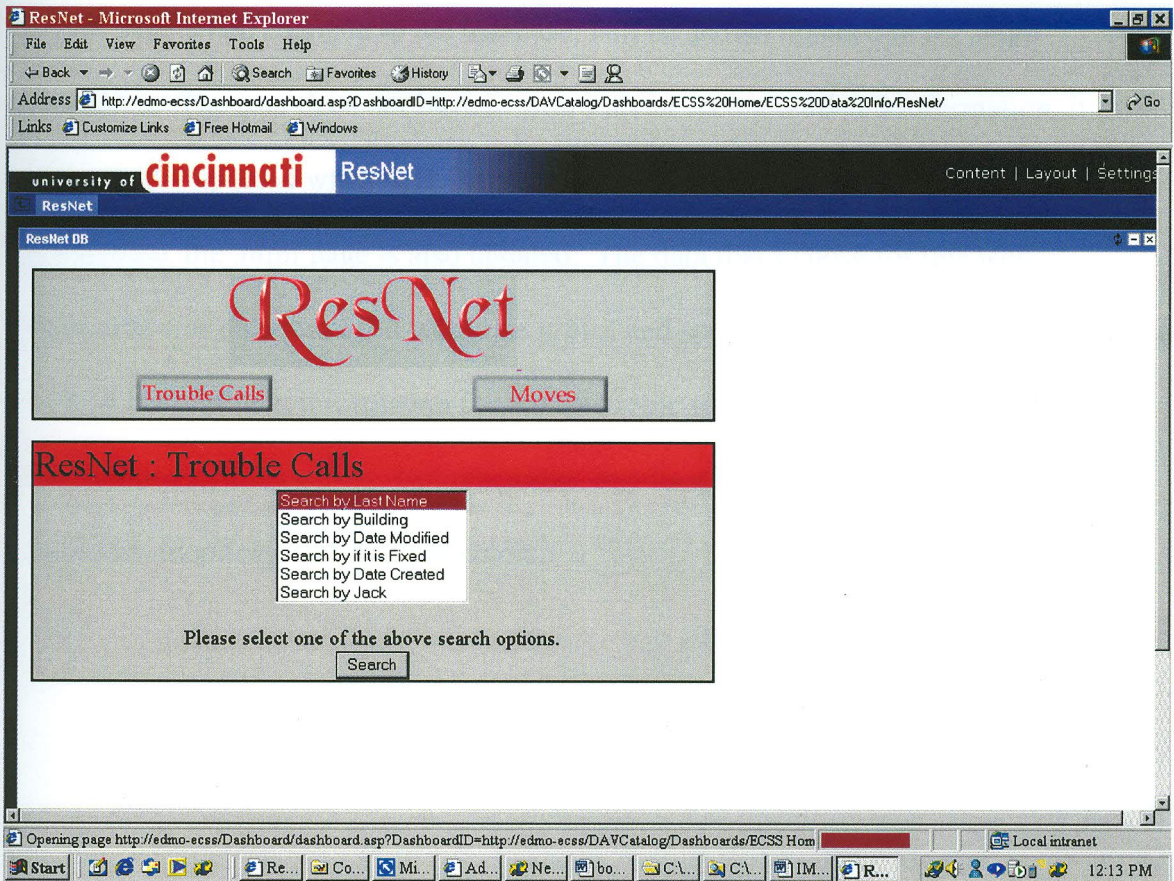


Figure 9. ResNet application in the Digital Dashboard.

The other web component on the *ECSS Data Info* page is an existing database (mmsd.mdb) that I converted from Microsoft Access to Microsoft SQL Server. The reason I did this was to extract data from the table that I thought was pertinent enough to bring to the Digital Dashboard. The data concerns hardware resources used by ECSS. By converting the database, I was able to extract the tables and change them from .mdb (Access) files to .mdf (SQL) files to .html files. By changing tables to .html format, I

was able to show the data in web-based format, which is necessary to integrate the data into the Digital Dashboard. I used SQL Server for security reasons, and so that the data in the database automatically updates the .html pages. I converted the tables by using the Web Assistant Wizard in SQL. Once converted to .html, I set the properties on the file so that the data, when changed in the database, will be shown updated in the .html application. The user does not have to worry about seeing outdated information, it is automatically updated when SQL Server data changes. Whenever new data is added to the database, the .html page is also updated. The data that I chose for this web component was data that I felt would be useful and specific to ECSS users. The database holds all the pertinent information for the electronic resources that ECSS "owns". The data includes serial numbers, manufacturers, and locations of resources such as computers, monitors, and data projectors.

The *ECSS Data Info* page provides links to all the pages. **Figure 10.** shows this page. The links are in **RED**. Once a user clicks a link, they are taken to the data page, **Figure 11.** The page shows the data along with the time and date that the page was last updated. If a user wants to update the page, all they need to do is hit the “refresh” button on their web browser.

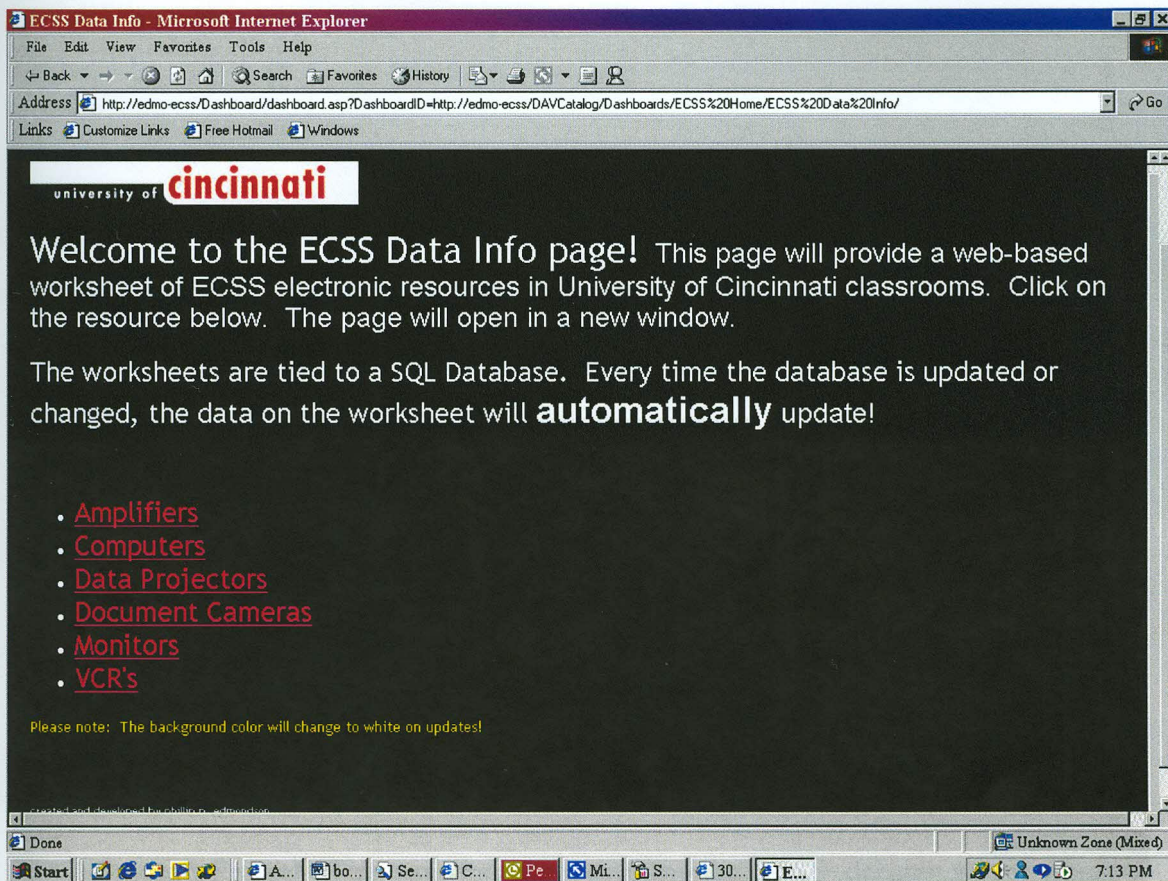


Figure 10. ECSS Data Info Page.

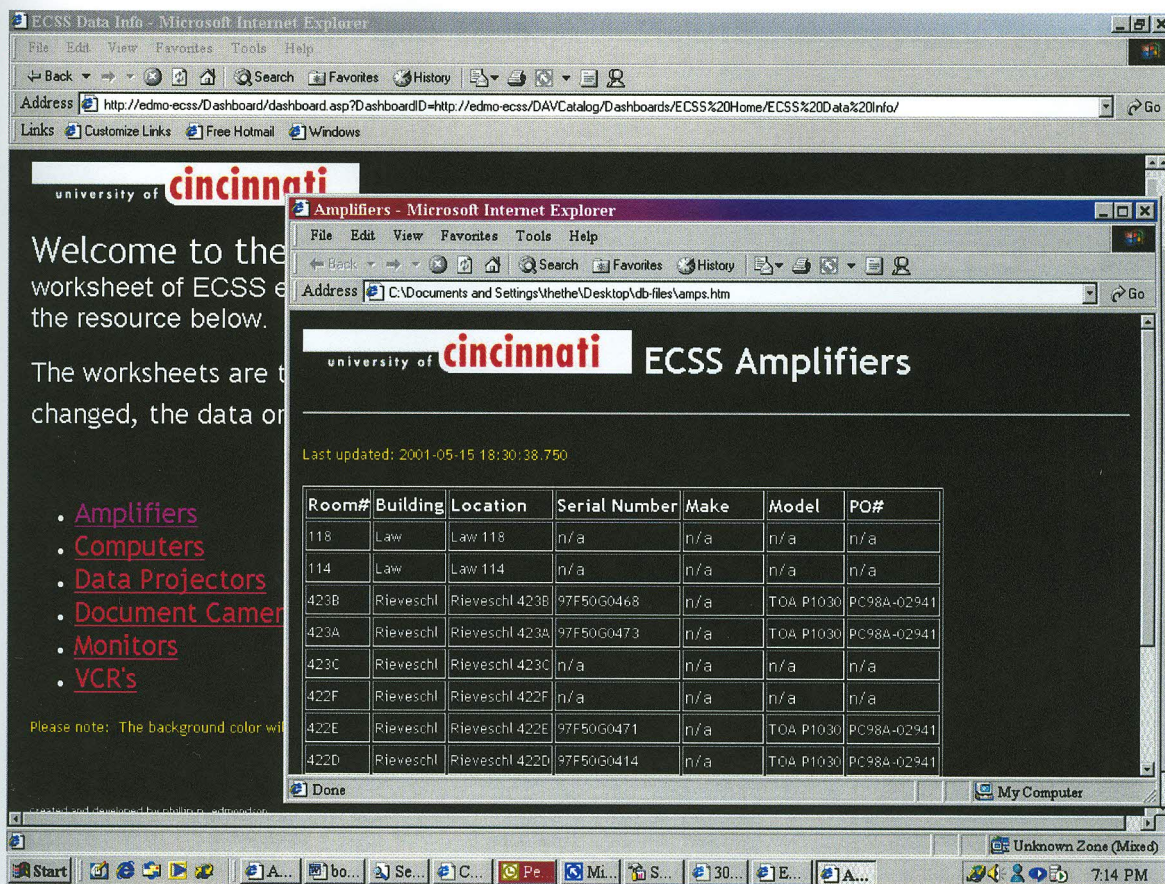


Figure 11. New page opens from ECSS Data Info page, providing relevant information.

The Project Scheduling page has two web components on it also. This page carries two future ECSS projects and was built using the premier project management tool, Microsoft Project. The projects are: converting the ECSS domain server from Windows NT to Windows 2000 Server, and rebuilding the ECSS Web site. Both projects require extensive planning and use most of the fundamentals learned in my Management in Information Technology class. The web components were built using Microsoft Project 2000. I had to spend some time with this web component because I had no experience with Microsoft Project. Microsoft Project gives ECSS the opportunity to plan and track projects allowing team members to communicate and collaborate on

projects department wide. **Figure 12.** shows the Project Scheduling page in Project 2000 format.

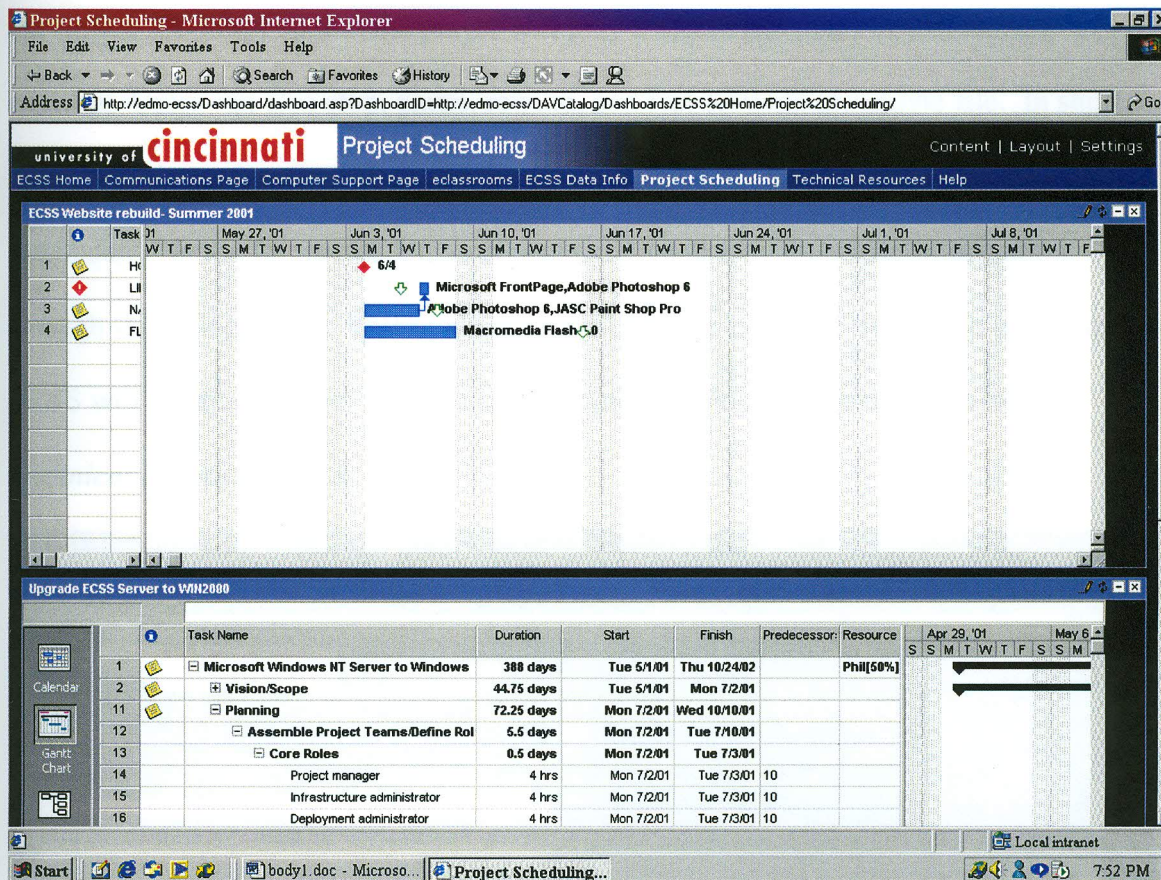


Figure 12. Project Scheduling page for ECSS Digital Dashboard.

Within the Technical Resources page users can access news facilitated by Moreover.com. Moreover.com powers intranets and extranets with targeted, up-to-the-minute information from thousands of news sources, industry sites, and discussion boards, thus giving our department a knowledge edge for intelligent, time-critical, educational, and technological decisions. This web component provides up-to-date Web feeds on developer-related news from a variety of online sources. The Technical Resources page also houses the MSN Encarta Reference web component, which enables users to conduct online searches using the Encarta encyclopedia or dictionary. I have

also incorporated Microsoft Windows Media Player into the *Technical Resources* page. I have done this to supply users with access to streaming video capabilities. I manipulated the Active X control so that the player will play a movie file that I downloaded to my desktop. Users can also stop, pause, rewind, and fast-forward the movie file. In short, the movie player functions the same way it does when not incorporated into the Digital Dashboard. In the future, the University of Cincinnati may distribute information through streaming video. This application will be able to handle that. With web cameras, ECSS will be able to make videos and distribute as needed. **Figure 13.** shows the *Technical Resources* page.

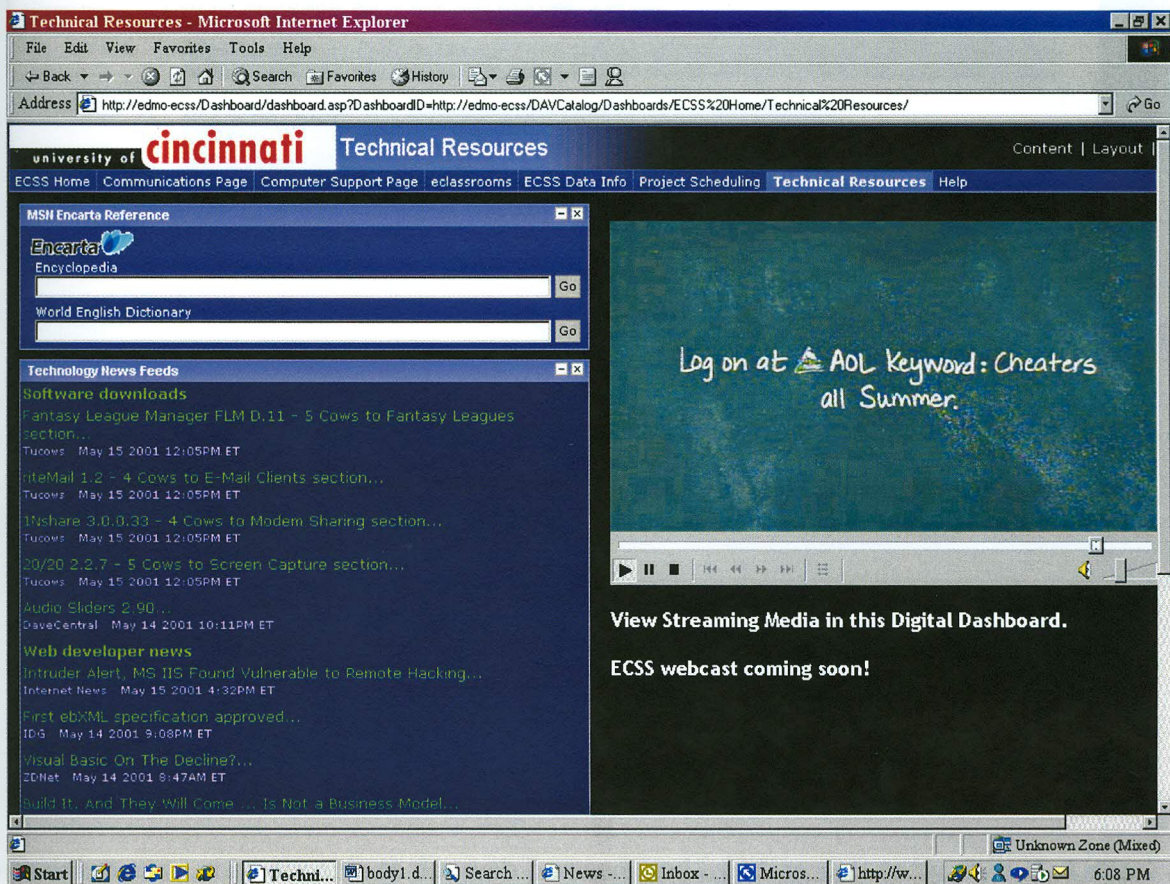


Figure 13. Technical Resources page in the ECSS Digital Dashboard.

Digital Dashboard users can enhance their interface by combining familiar Microsoft Office 2000 features with easy-to-use Web-browser-style controls. Users can also easily add and remove Web components or re-position them on their screen. **Figure 14.** shows an example of how a user can re-position web components in the Digital Dashboard.

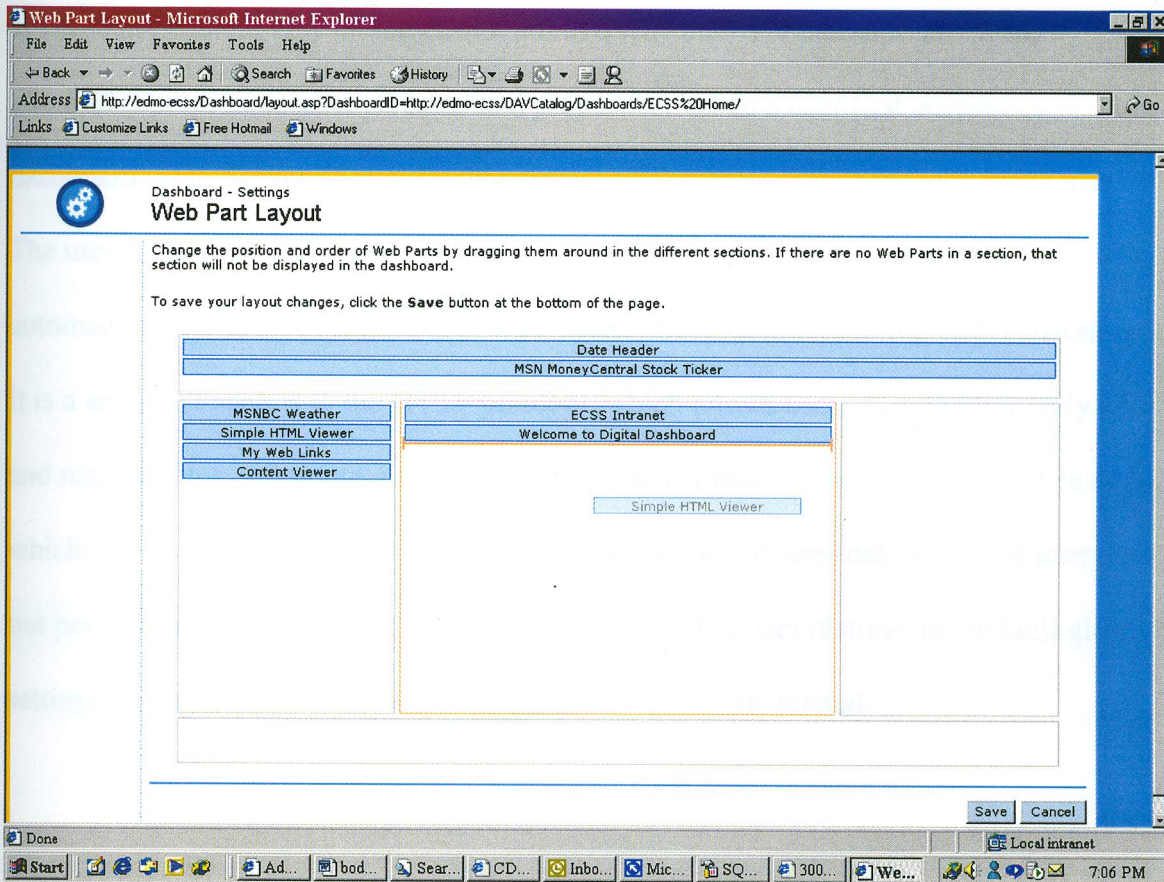


Figure 14. Re-positioned web components in the ECSS Digital Dashboard.

Users may have trouble creating their own web parts. Creating personalized web parts requires advanced web development skills. Users may not be able to create their own; however, they are able to use web parts created by Microsoft or by myself. Users can also add or delete web parts from the Digital Dashboard. Users can personalize

shared dashboards and Web Parts by setting user-specific properties in the dashboard factory settings pages, or through a programmatic or scripted solution.

Personalization is limited to setting user-specific properties. Although each user can decide which Web Parts to show or hide, users of the same dashboard cannot create a custom set of Web Parts that are only available to them. Adding or deleting Web Parts changes the content of a shared dashboard in a way that is apparent to all users.

The SQL Server maintains personalized properties. When a user first accesses a dashboard, SQL Server Digital Dashboard uses IIS authentication to identify the user.

The user ID is passed to the WebDAV provider and personalization is handled automatically. WebDAV stands for "Web-based Distributed Authoring and Versioning".

It is a set of extensions to the HTTP protocol, which allows users to collaboratively edit and manage files on remote web servers. An entry is made for that user in a profile table, which subsequently stores any custom property settings the user defines. If the user does not personalize the dashboard, the storage is unused. If a user restores the default global settings, the personalized user-specific property values are deleted.

I can also limit the permissions of the dashboard to limit the authorized viewers of the application. **Figure 15.** shows how I can change permissions for each user.

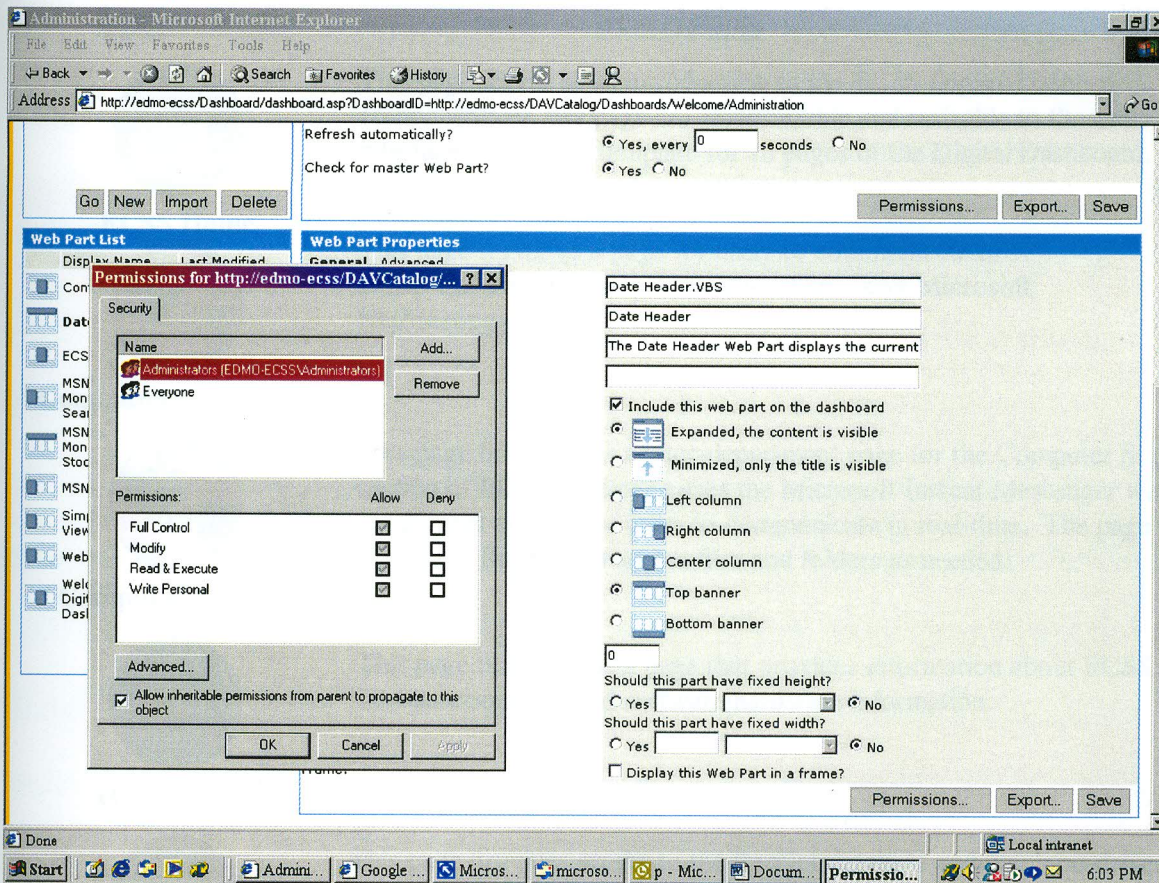


Figure 15. Changing permissions for a web component in the Digital Dashboard.

2.1.1 User Profile

The target users for this application will be all ECSS personnel. This includes the department head, the hardware engineering staff, the computer support staff, electronic classroom planning services, and the video-conferencing manager. These employees all have above average computer skills, and are literate and competent in all of the software applications included in the Dashboard.

Organizational Chart

<u>Section Name</u>	<u>Description</u>
 ECSS Home	This page serves as an introduction to the ECSS Digital Dashboard. The web components on this page are customizable and resizable to the user. The interface serves as a template for all pages of the Digital Dashboard.
 Communications Page	This page serves as a page for users to communicate to ECSS classrooms or department workers using Microsoft NetMeeting
 Computer Support	This page functions as a inter-department page for the Computer Support section of ECSS. The page uses the Microsoft Instant Messenger web component and allows users to communicate in real-time. The page also allows Computer Support to access files and folders as needed.
 eClassrooms	This page functions as a page that provides information about ECSS classrooms, i.e. classroom size and software/hardware information.
 ECSS Data Info	This page provides access to the ResNet database and database-driven department hardware information. Information is stored in a SQL database and will be updated on the HTML page as data is changed.
 Project Scheduling	This page allows users to track, schedule, and plan future ECSS projects using Microsoft Project 2000.
 Technical Resources	This page serves as application that provides daily news feeds from Moreover.com. The page also allows ECSS users to view streaming audio/video information using an Active X Control, Windows Media Player.
 Help	This section is available to the Digital Dashboard user throughout the application. It provides detailed information for users to set up, view, customize, execute, and navigate their Dashboard.

2.1.3 Interface Design/Navigation

There are two ways users can view the ECSS Digital Dashboard. Users can view it from Internet Explorer or Microsoft Outlook. In Internet Explorer, the Digital Dashboard will function and appear as a normal web page.

In Microsoft Outlook 2000, creating a folder allows a user to set an arbitrary URL as a Home Page for the folder. The user will be able to run the Digital Dashboard as a folder Home Page within Microsoft Outlook 2000. **Figure 16.** shows how to configure the *test* dashboard folder Home Page to display the “Digital Dashboard”.

Users can also modify an entry in the computer registry to display the Dashboard as their *Outlook Today* page. The *Outlook Today* page is the opening screen in Outlook 2000 for most users. I have chosen this option for my project. I arranged my *Outlook Today* page (in the registry) to be set to my department Digital Dashboard URL. The registry path for this option is: `HKEY_CURRENT_USER\software\Microsoft\Office\9.0\Outlook\Today`.

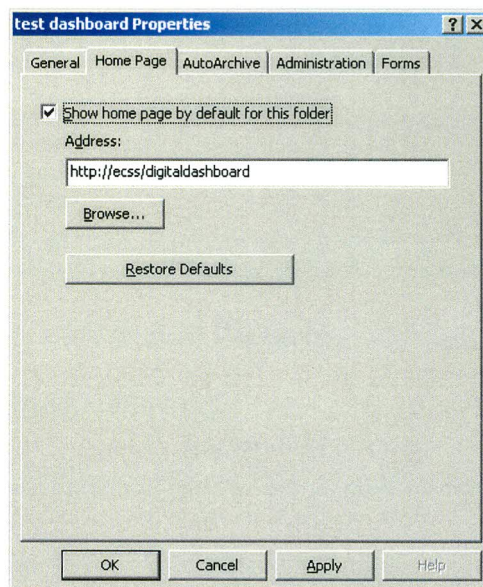


Figure 16. Configure Home Page of test folder in Microsoft Outlook to
<http://ecss/digitaldashboard>

2.1.4 Icons/Graphical Symbols

The graphic symbols that will form the key points of interaction will be the navigation buttons on the Dashboard. Normal Windows navigation applies to the Digital Dashboard. Normal Windows navigation means that users familiar with any Microsoft Windows platform or application will navigate through the Digital Dashboard the same way they do in other Windows applications. Users will receive a web “tool tip” when they hover over a page in the Digital Dashboard. The tool tip will provide a brief description of the page.

2.1.5 Color Scheme

The color scheme and picture elements in the Dashboard coincide with the University of Cincinnati colors. The background for all pages are black, and all have the University of Cincinnati logo set in the header of each page.

2.1.6 Help

The user will get necessary information about the Digital Dashboard and how to navigate in it from an .html page that I created and implemented within the Dashboard. The .html page is available from the “Help” navigation button. The Microsoft and Digital Dashboard images located in the “Help” page were taken from Microsoft’s Web site. **Figure 17.** Provides a view of the “Help” page.

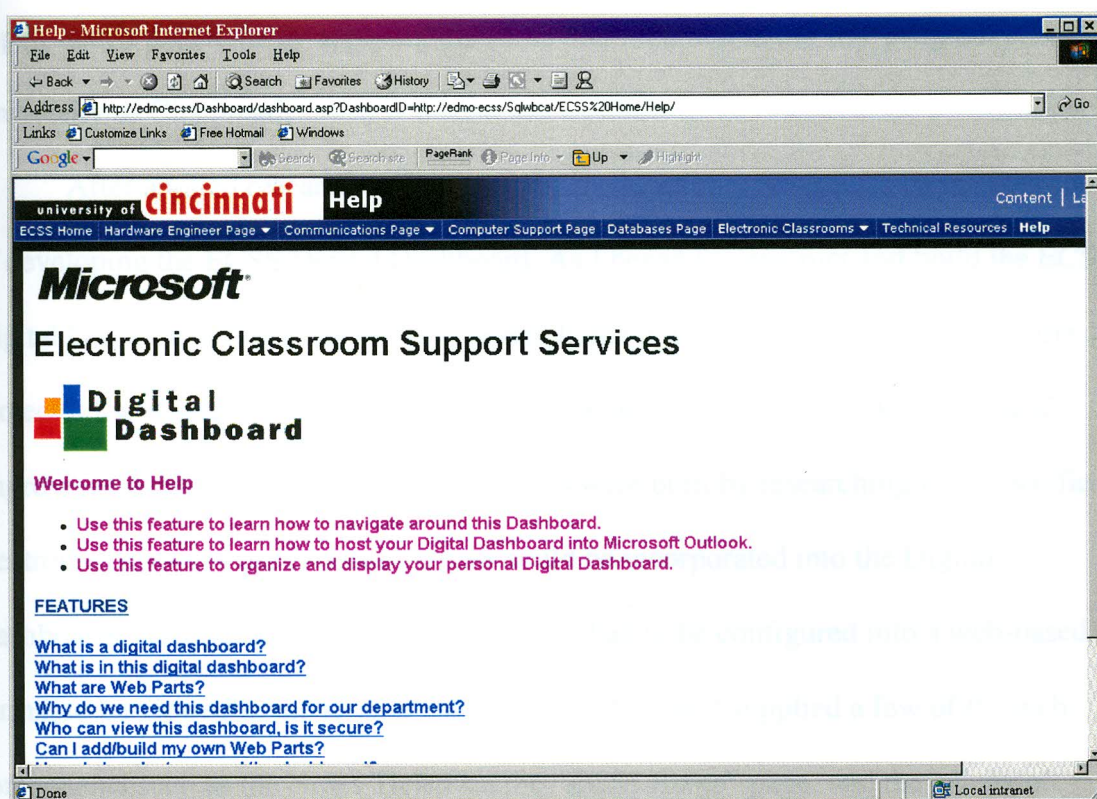


Figure 17. Digital Dashboard “Help” Page

3.0 Objectives of the Project/Deliverables

The purpose of this project was to design an application that would help efficiently facilitate the daily operations and processes at ECSS. When I first joined ECSS, I personally believed that the department lacked organization. My co-workers and I were tasked by department head, Jane Combs to improve the operations at ECSS as

prescribed by her boss, Frederick H. Siff, Vice President for Information Technology, University of Cincinnati, through the aforementioned UCit organizational survey. After several department meetings, I began to research possible electronic solutions. During my first few weeks on the job, I realized that one of the applications that I had learned in my Advanced Business Applications class, Digital Dashboard technology, might be a suitable solution. I believed that I could develop an electronic solution to the department's problems by applying the skills that I learned in the IET program at the University of Cincinnati.

After applied research and counsel from educational advisors, I began the process of developing the ECSS Digital Dashboard. As I began to construct and build the ECSS Digital Dashboard, I developed, from research, the objectives and deliverables of the project. I was able to fully determine where the department was weak and needed improvement. The objectives and deliverables were built by researching what specific electronic resources used most by ECSS could be incorporated into the Digital Dashboard. The electronic resources were and had to be configured into a web-based format to be viewed in the Digital Dashboard. Microsoft supplied a few of the web components such as the News Ticker on the "*ECSS Home*" page, and the Microsoft Instant Messaging tool on the "*Computer Support*" page. It was up to me to learn how to build, configure, and display the web components in an interactive format.

My deliverables coincided and paralleled my research of Microsoft Digital Dashboard technology: The following objectives were used for this project:

- **Help ECSS workers focus on department priorities.** The Digital Dashboard application reduces information overload by delivering

relevant and important information that workers can process quickly and analyze closely, promoting better informed departmental decisions.

- **Extending familiar productivity tools.** The Digital Dashboard application is integrated with Microsoft Office 2000. Microsoft Office 2000 integrates familiar productivity tools with the Web, connecting ECSS workers to information and to one another. Digital Dashboards based on the Microsoft Outlook messaging and collaboration client and Microsoft Office 2000 enable workers to take advantage of the analysis tools, collaboration capabilities, and Internet- and messaging-standards support built into Microsoft Office 2000.
- **Delivering information, in the office or on the move.** ECSS workers can use a Digital Dashboard no matter where they are. Information from different sources, including favorite Web sites and shared public folders, can be synchronized with Internet Explorer for offline viewing and analysis.
- **Access to multiple information sources.** The ECSS Digital Dashboard solution is integrated with the departments existing department applications, combining data from multiple sources in one easily accessible location. A Digital Dashboard can make information accessible from virtually any source—legacy systems, Exchange Server, SQL Server, or Web servers—for both online and offline use.
- **Integration of information.** The ECSS Digital Dashboard provides a unique view of information from a variety of sources. Because a Digital

Dashboard can incorporate content from Office 2000 applications, workers can view personal information such as e-mail, calendars, tasks, and work or team files as well as team, corporate, and external information. Server-based intranet portals generally do not support this capability. Our department Intranet will serve as a portal within the Digital Dashboard providing more work association capabilities. Digital Dashboards also promote collaboration and an easier flow of information. Using the team-oriented capabilities of Microsoft Outlook 2000 and Microsoft Exchange 2000 Server, ECSS workers can easily create shared documents, discussions, project tasks, and other collaborative solutions. ECSS employees can also view a wide range of work-related information located on the Web, such as research materials, news and stock tickers, and targeted news feeds covering specific industries.

- **Interactivity with information.** The ECSS Digital Dashboard provides interactive web capabilities that enable individuals to quickly obtain specific, in-depth perspectives on department applications.

4.0 Designs and Development

The information in this section serves to provide information on the software/hardware used for the project, budget for the project, and timelines for the project.

4.1 Software

For this project, I used the following software applications:

- Microsoft Server 2000-Host Operating System
- Microsoft Digital Dashboard Resource Kit 2.0-Developers Kit for Dashboard
- Microsoft Office 2000 Premium-MS Outlook & FrontPage
- Microsoft Visual Studio 6.0-Programming Application
- Microsoft Exchange Server-Host email application
- Microsoft Project 2000- Project Management Software
- Internet Information Services-Web server
- The Microsoft Office 2000 Intranet Kit
- Microsoft NetMeeting Developers Kit
- Microsoft Office Server and FrontPage Extensions
- Internet Explorer 5.5-Web browser.

4.2 Hardware

- ECSS Network Server
- Three Workstations (three workstations and a server create a true network)

4.3 Budget

Title	Description/Rationale	Cost
Internet Explorer 5.5	Host Web Browser	\$ 0.00
Internet Information Services	Web Server	\$ 0.00
Microsoft Server 2000	Host Operating System	\$ 849.95
Microsoft Digital Dashboard Resource Kit 2.0	Kit needed to develop Digital Dashboard	\$ 0.00
Microsoft Exchange Server 5.5	Host email application	\$ 1,485.95
Microsoft Interdev 6.0	Will use to develop some Web components	\$ 485.95
Microsoft NetMeeting Developers Kit	Used to implement NetMeeting into Digital Dashboard	\$ 0.00
Microsoft Office 2000 Intranet Kit	Used for department intranet	\$ 0.00
Microsoft Office 2000 Premium	Used to develop Intranet and Web components	\$ 657.95
Microsoft Project 2000	Project Management software	\$ 408.00
Total:		\$ 3,987.80

4.4 Timeline

Senior Design I

Preliminary Research

- Pilot group chosen –ECSS
- Conduct needs assessment
- Tap information resources

Actual Research

- History of Digital Dashboard
- ECSS needs
- Hardware/Software research
- Time and budget

Senior Design II

- Developed Dashboard for ECSS department and Senior capstone
- Developed department database of materials and resources
- Developed department Intranet
- Meet with advisors
- Design Freeze rough draft.
- Progress Report 2
- Design Freeze final
- Test prototype
- Present prototype to ECSS staff
- Oral presentation to IET faculty and peers.

Senior Design III

- Developed web components (Instant Messenger, Project Management) to enhance Digital Dashboard
- Meet with advisors and faculty from IET
- Provided advisor with Progress Reports
- Completed test of final project
- Presented final project to staff
- Presented final project to advisors
- Presented final project to IET faculty and peers.

5.0 Proof of Design

My objectives for the ECSS Digital Dashboard, in detail, are located in *Section 3, Objectives of the Project/ Deliverables*. The core detail describing the functionality of the project is located *Section 2.1.1, Description of Solution*. Specifically, my goals of the project were to develop an interactive, web-based portal that brought ECSS resources and applications to one interface. By incorporating applications into one interface, I was able to create instant organization of ECSS resources and provide users better communication tools.

This project met those deliverables by incorporating web components built in HTML/XML format using Microsoft FrontPage. Researching Microsoft Digital Dashboard technology and preliminary research of department applications built the web components or web parts. Digital Dashboards were designed to create real business solutions for companies. The idea behind Digital Dashboard technology is a flexible portal framework that integrates a corporation's diverse resources in a single browser-based interface. I believed that from my research, and instructions from Jane Combs, that I could incorporate the same technological fundamentals to ECSS. I believed that ECSS staff and the department craved a real business solution that organized personal and job-

related resources, and facilitated communication. I believe that most facets of life and business will incorporate some electronic, web related devices or services.

The project also met the deliverables by converting existing applications into real-time web components, and incorporating the Digital Dashboard into Microsoft Outlook 2000.

I expanded the flexibility of this project by incorporating the Digital Dashboard into Microsoft Outlook 2000 (Figure 18.).

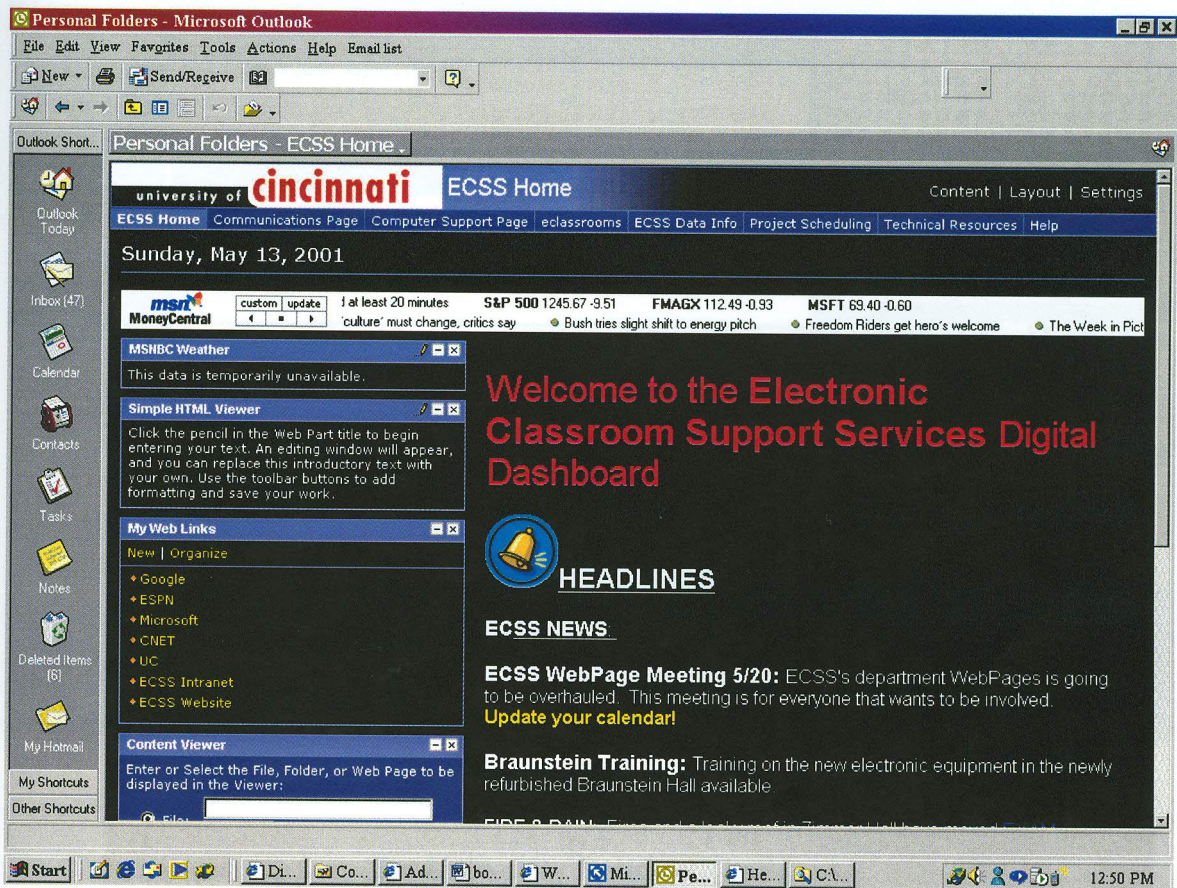


Figure 18. Digital Dashboard in Microsoft Outlook 2000.

By doing this, I was able to deliver ECSS users more options, compatibility, and flexibility. Microsoft Outlook 2000 is the one application that ECSS uses throughout the day. Users no longer have to stop what they are working, close or minimize the

application, and open another application. From Outlook 2000, users can now click from the department applications in the Digital Dashboard to their Inbox in Outlook, or to the Calendar View to schedule a meeting. The department uses Microsoft Outlook Calendar to share sub-calendars, schedule events such as staff meetings or activities, and also schedule ResNet appointments (**Figure 19.**).

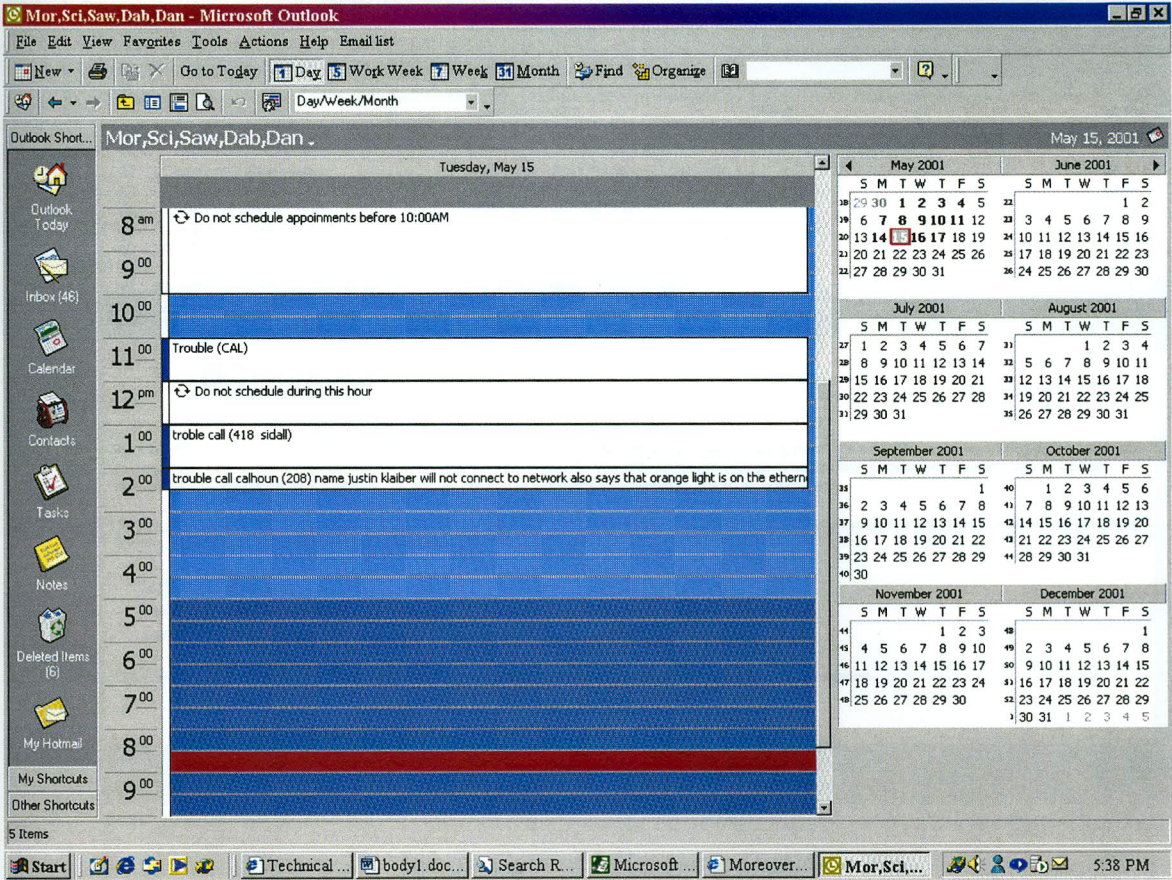


Figure 19. Shared Calendar in Outlook 2000, showing ResNet appointments for University Residence halls.

ECSS workers use Outlook email to communicate with people electronically.

Figure 20. shows the Inbox from Microsoft Outlook 2000. Users can go back to the Digital Dashboard by selecting Outlook Today in the upper left corner of Microsoft Outlook 2000.

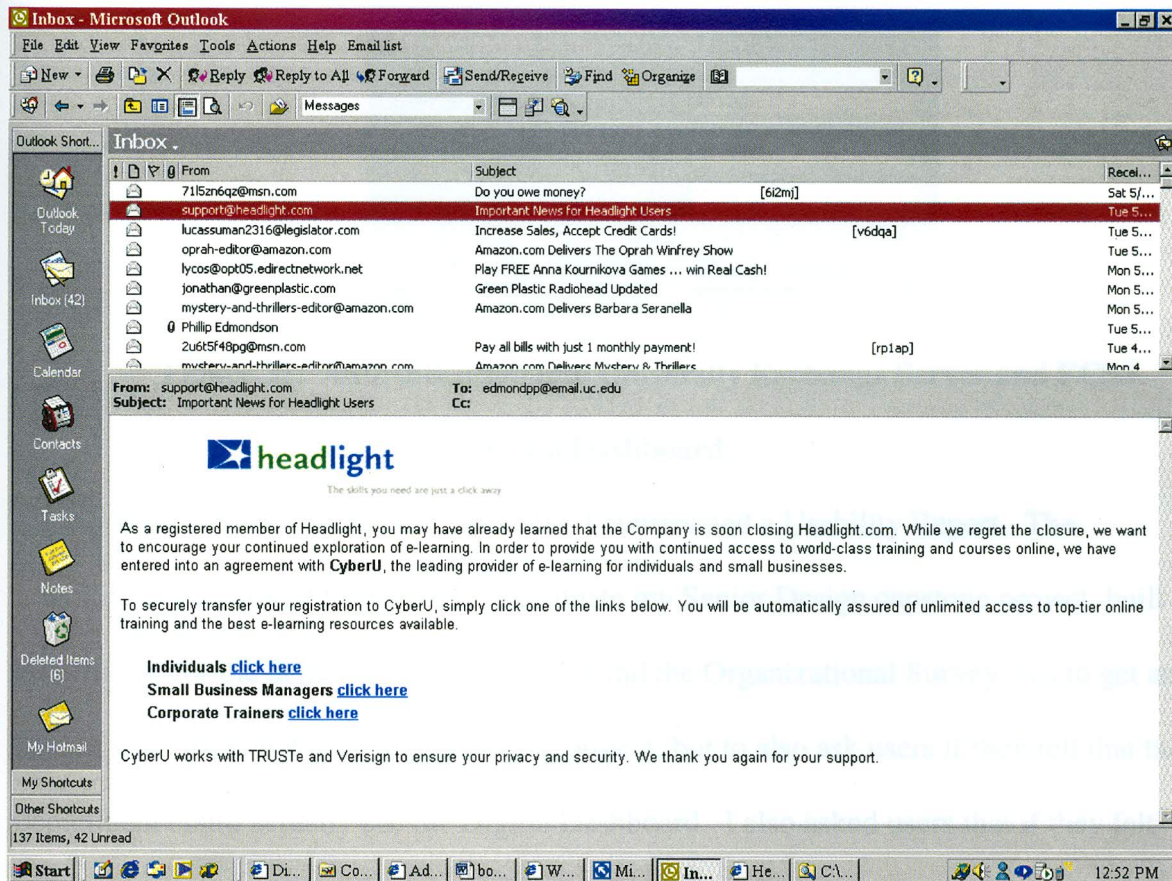


Figure 20. Inbox view of Microsoft Outlook 2000.

The department secures Outlook by connecting it to the University of Cincinnati Exchange Server. The University Exchange Server allows our department to have authentication, thus providing security. Figure 21 shows authentication into Microsoft Outlook and Digital Dashboard.

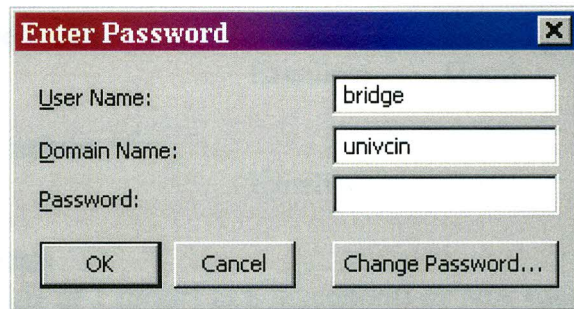


Figure 21. Authentication into University Exchange Server and ECSS Digital Dashboard.

With the help of Dr. Sam Geonetta, I constructed a Usability Report. The Usability Report asked ECSS users to evaluate my Senior Design capstone project, built specifically for the department. The idea behind the Organizational Survey was to get an idea of what users not only thought of the project, but to also ask users if they felt that the department could actually use the Digital Dashboard. I also asked users that if they felt that the Digital Dashboard was an interactive application, did they feel that the Digital Dashboard could enhance the department, and help solve the objectives of the UCit organizational survey. The questionnaire below shows the Usability Report provided to beta testers of the Digital Dashboard:

5.1 Usability Report

ECSS Usability Report

Please take a moment to complete this evaluation form. Your comments are important to improve the product. Please complete the form at the end of the presentation. Your critique is appreciated.

ECSS Digital Dashboard - General Questions

1. Overall effectiveness of the program	Excellent	Good	Fair	Poor
2. Program organization and execution	Excellent	Good	Fair	Poor
3. Do you like the methods used in the program?	Excellent	Good	Fair	Poor
4. How do you like the graphics, sounds and text?	Excellent	Good	Fair	Poor

Ease of Use/Interface design

(rate each criterion on scale of 1 (poor) to 5 (excellent) or N/A (not applicable))

1 2 3 4 5 ___ N/A - Navigation within page?

1 2 3 4 5 ___ N/A - Icons and graphical symbols?

1 2 3 4 5 ___ N/A - Help available?

1 2 3 4 5 ___ N/A - Overall ease of use: what's the learning curve?

1 2 3 4 5 ___ N/A - Does it enable the user to do what the program is apparently designed to do?

Design Features

1 2 3 4 5 Clear interface

1 2 3 4 5 Good level of interactivity

1 2 3 4 5 Clear help

1 2 3 4 5 Use of color, icons, etc.

1 2 3 4 5 Satisfies intended use

Strengths of the Digital Dashboard:

Weaknesses of the Digital Dashboard:

Potential of the Digital Dashboard:

Overall Rating:

(Low) 1 2 3 4 5 (High)

5. Features that would make the program better:
6. Is this a workable solution for ECSS?
7. General comments/suggestions:

ECSS Testing Form

Company: ECSS

Bugs:

5.2 Usability Report Results

The general results of the survey show:

- Users were pleased with the overall effectiveness and organization of the project.
- Graphics and Methods used in the project scored high marks
- Available Help scored lowest among all criterion
- All persons surveyed believe that the project satisfies intended use.
- Average potential for the project scored a 4 out of 5.

Some of the feedback I received for “Strengths of Digital Dashboard:”

- “Customizable interface, central location of resources.”
- “(Incorporation into) Microsoft Outlook.”
- “Easy Access.”

- “..data spreads fast!”

Some of the feedback I received for “Weaknesses of Digital Dashboard:”

- “Compatibility with non-Windows?”
- “A little buggy..”
- “Can’t enter data from the dashboard to databases.”

Some general feedback:

- “Great start, seems very useful.”
- “Definitely could be used at ECSS.”
- “..better than My Yahoo..”
- “People will use it the more integrated it becomes..”
- “It provides a solution at ECSS.”

6.0 Conclusions and Recommendations

The ECSS Digital Dashboard meets the objectives and deliverables as mentioned in “*Description of Solution.*” The project consists of a highly interactive, electronic resource that is user specific, and uses state-of-the-art technology.

Digital Dashboard technology is so new that the research for the project was minimal and repetitive. I learned a lot about the technology through trial and error on my own project. I continually crashed the project by forcing technology to work before I knew how to use it. The most help I could find was through a Digital Dashboard Newsgroup. The Newsgroup, microsoft.public.digitaldashboard, serves as a help, troubleshooting pipeline for developers like myself.

Converting existing applications and systems into web components is a means of how business and technology will interact in the near future. In my opinion, most of our

daily activities will incorporate some kind of web-based formulas or formats. The ECSS Digital Dashboard is an example of a business solution that incorporates existing applications into web format, eventually making them accessible through wireless technology.

My main goal for the project was to build an IT solution that organized department resources and enhanced communication. Because the department failed to effectively communicate, jobs were duplicated. The department also failed to properly manage projects due to the lack of communication. Project Management does not need to have a software application to do the work. Project Management involves planning and communication. Users do not need Project Management software to do the work for them; the Digital Dashboard serves as a portal that allows ECSS workers to work collaboratively by sharing work, resources, and tracking progress.

This project can evolve, adapt, and become very useful to ECSS. As electronic classrooms continue to evolve at the University of Cincinnati, the department will grow, as will the applications, resources, personnel, and responsibility. The newest version of Digital Dashboard technology released by Microsoft allows for wireless availability through Pocket PCs and Wireless Access Protocol (WAP)-enabled phones. Synchronization features support offline use on the Compaq iPaq. This gives a preface of the capabilities to come in the future.

Consequently, this technology is beginning to be incorporated into daily routines and business functions. The abundant resources an application can offer is very attractive to businesses that want to increase efficiency, productivity, and communication. There is

a demand for personalized corporate portals or Digital Dashboard technology. This project serves to provide a glimpse of future business solutions.

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